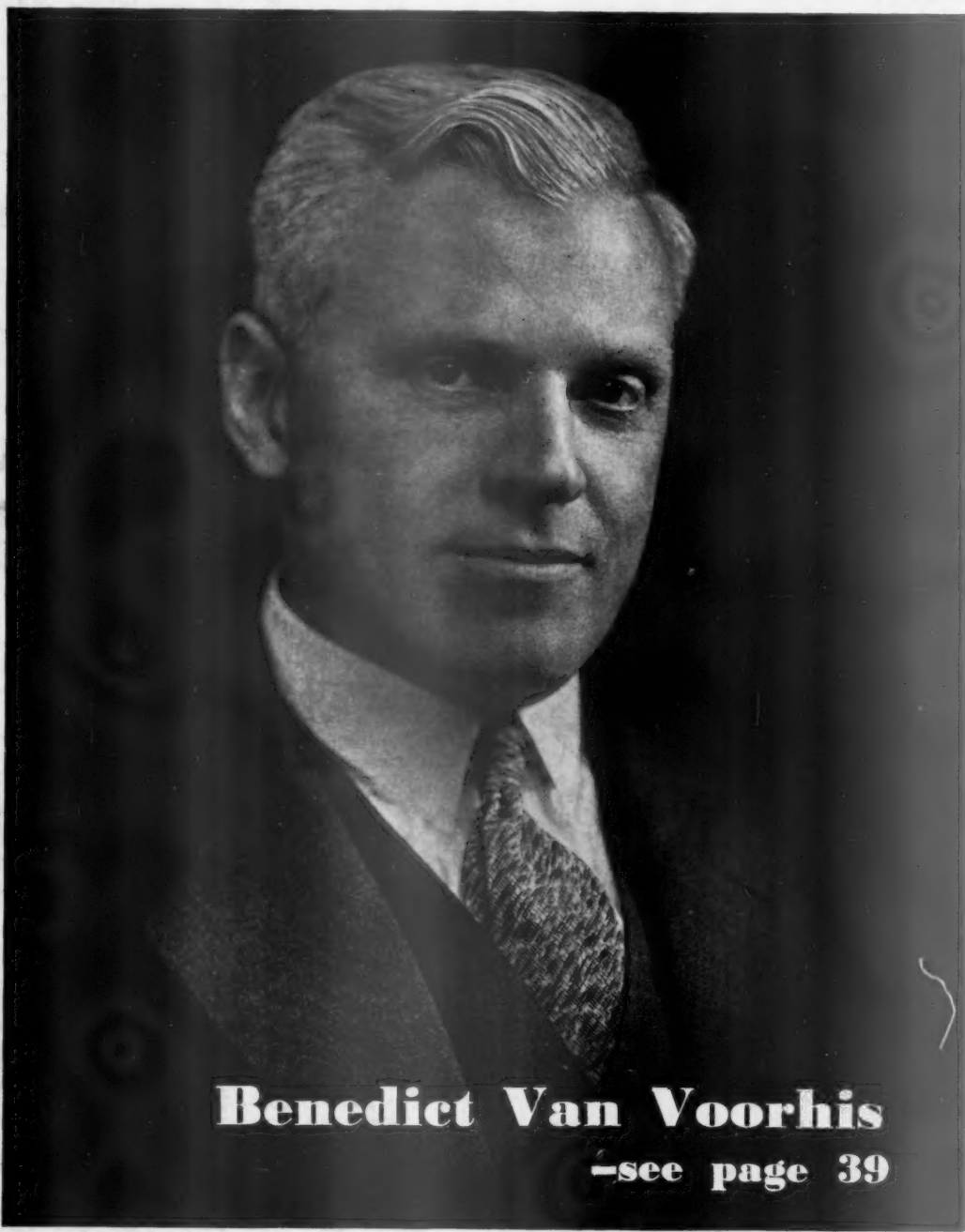


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PURCHASING

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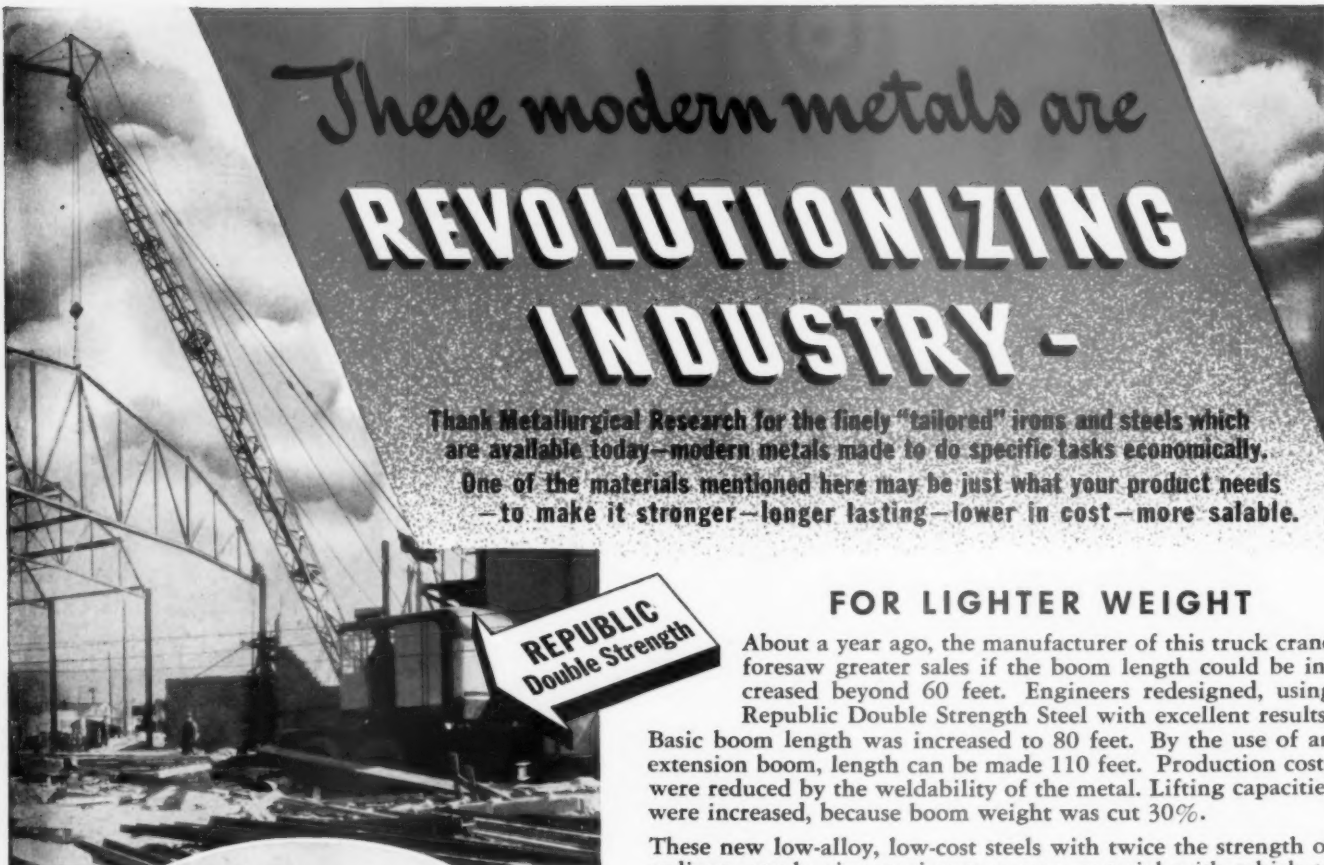
Benedict Van Voorhis

—see page 39

Photo by Bachrach

SEPTEMBER 1939

Vol. VII No. 9



These modern metals are **REVOLUTIONIZING INDUSTRY -**

Thank Metallurgical Research for the finely "tailored" irons and steels which are available today—modern metals made to do specific tasks economically. One of the materials mentioned here may be just what your product needs—to make it stronger—longer lasting—lower in cost—more salable.

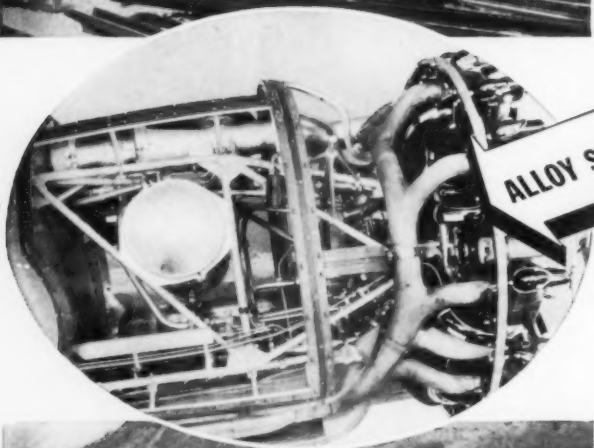
REPUBLIC Double Strength

FOR LIGHTER WEIGHT

About a year ago, the manufacturer of this truck crane foresaw greater sales if the boom length could be increased beyond 60 feet. Engineers redesigned, using Republic Double Strength Steel with excellent results.

Basic boom length was increased to 80 feet. By the use of an extension boom, length can be made 110 feet. Production costs were reduced by the weldability of the metal. Lifting capacities were increased, because boom weight was cut 30%.

These new low-alloy, low-cost steels with twice the strength of ordinary steels give engineers a new material with which to design—for profit.



ALLOY STEELS

FOR GREATER SAFETY

Think, if you can, of any other industry that has made such rapid strides as Aviation! Yet the story of its progress is the story of the development of alloy steels.

In 1916 the first chrome-nickel-molybdenum crankshaft steel for use in Liberty motors was made by a company now a unit of Republic Steel Corporation. Today, Republic is supplying steels to the leading manufacturers of aircraft, engines and parts—and is the world's largest producer of quality aircraft steels. Let our metallurgical experience guide you in the economic selection of alloy steels for aviation applications.



ELECTRIC WELD PIPE

FOR ECONOMY IN USE

Until recently, crude oil has been transported from the Lance Creek Field, Wyoming, only by tank car. Now a new pipe line, 157 miles of it Republic Electric Weld Line Pipe, carries the crude more economically to refineries at Glenrock and Denver.

Republic has invested millions of dollars to perfect electric resistance pipe welding—producing perfectly-round, uniform-wall pipe with a weld as strong as the wall—so that you may obtain greater value in tubing, casing, line pipe; gas, water and steam pipe; boiler tubes; electrical conduit; and mechanical tubing. Tell us what interests you.

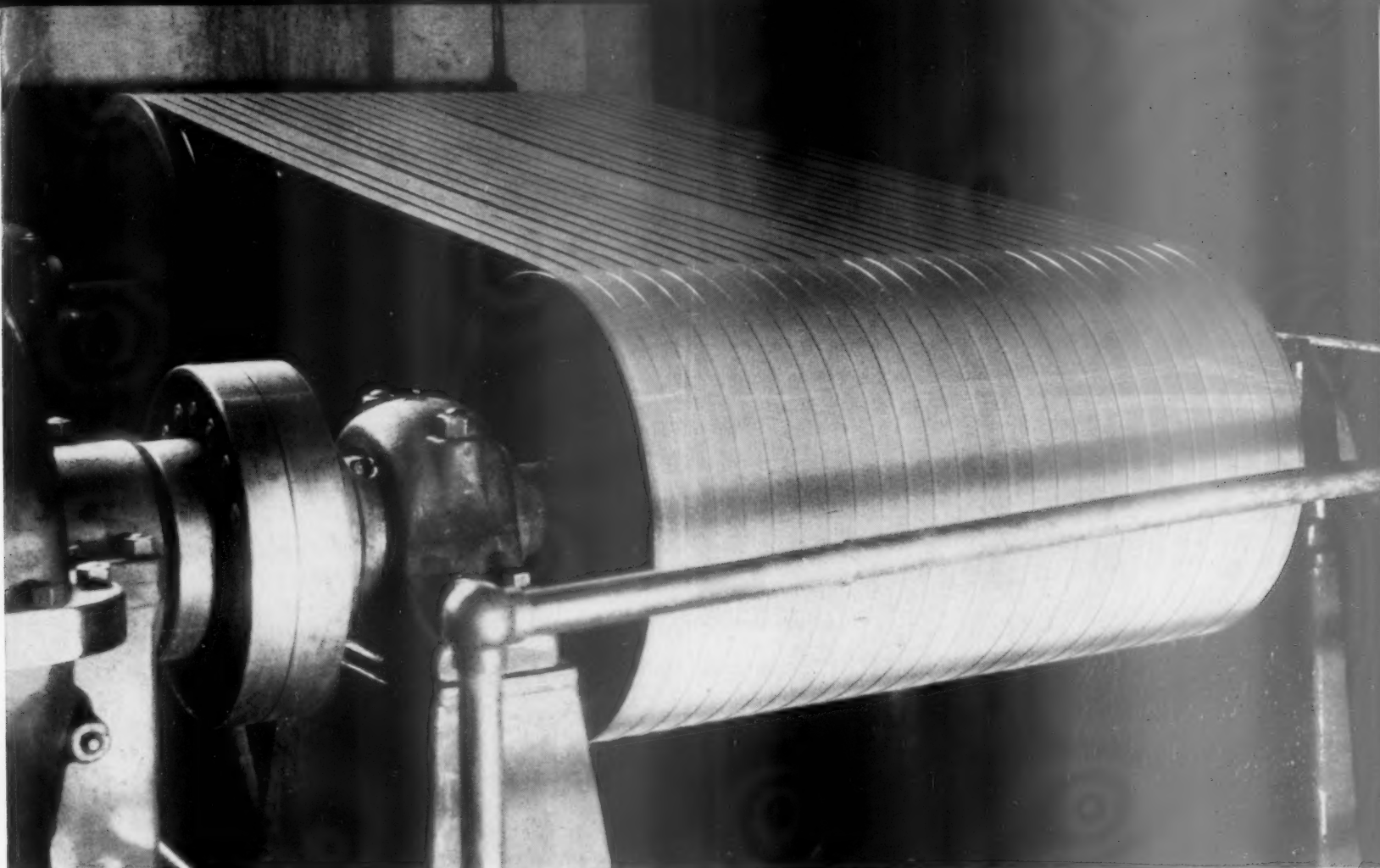
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GENERAL OFFICES • CLEVELAND, OHIO

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BERGER MANUFACTURING DIVISION • NILES STEEL PRODUCTS DIVISION



When writing Republic Steel Corp. for further information, please address Department EP.



Goodrich tension-matched V-Belts last 14 times longer on belt-killing turbine drive

BELT cost was high on the big steam turbine drive shown above. Ordinary V-Belts could not pull the load; and failed in less than a month.

Then Goodrich V-Belts were tried — matched under operating tension so that each belt carries its full share of the load, and slippage and resultant wear are prevented. After 14 months these Goodrich Belts are still running and they look as sturdy as the day they were installed.

Next time you buy V-Belts remember this new additional value — sets matched under operating tension. Belts which measure the same off the drive often — in fact usually —



Goodrich machine which measures Goodrich V-Belts under actual operating tension.

develop differences in length once they start operating. The longer belts then slip, wear out, put undue load on the others. You can avoid this costly failure by specifying Goodrich matched sets — V-Belts measured under operating conditions.

More Goodrich Construction Improvements

There are other Goodrich V-Belt advantages that will save you money, reduce time and work now taken by shutdowns for belt repair and replacement. Some of these are a rubber-and-fabric cover to protect the belt from dust and moisture; low-stretch cords which reduce stretch and slippage; Age-Rite, a compound to help Goodrich belts resist oxidation; and a special rubber compound which reduces internal heat by 75%.

V-Belts should and can be an efficient, trouble-free, economical means of transmitting power. Call in your Goodrich Distributor and let him show you the improvements in Goodrich V-Belts which make these belts last so much longer than belts of even a few years ago. The B. F. Goodrich Company, Mechanical Rubber Goods Division, Akron, Ohio.

Goodrich

ALL products *problems* IN RUBBER

Recent Improvements in Goodrich V-Belt



PURCHASING

Established 1915 as "The Purchasing Agent"
Consolidated with "The Executive Purchaser"

PURCHASING is an independent journal, not the official organ of any association. It is the only publication of national scope devoted exclusively to the interests and problems of the purchasing executive in industry and government.

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MEMBER



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September 1939

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PAGE 4

PURCHASING



**seals the
deal FAST...for purchasing men**

While the price of linseed oil was fluctuating rapidly, a purchasing agent received an advantageous offer. He knew that such an offer had to be accepted at once. He turned to Long Distance to *seal the deal* FAST. • But making rapid commitments is only one of many purchasing usages of the telephone. Try Long Distance service systematically . . . and see how it helps you buy the *right* quality and *right* quantity, at the *right* time and the *right* price, from the *right* source. • Long Distance is *personal, clear, direct*, permitting discussion of terms, delivery and specifications. And it's low in cost for the big job it does.



Yours on Request

Purchasing agents will find it well worth their while to read the publications reviewed on this and the following pages. From among the many submitted to us, they have been selected by the editors as having greatest interest and utility value to purchasing agents.

To obtain copies, simply fill in and mail coupon at the bottom of this page.

832. BOLTS, NUTS, SCREWS, RIVETS. Clark Bros. Bolt Co. has just issued a new and enlarged catalog and reference book No. 39. Comprising 90 pages, 6¼x9¾, it includes list prices, tables, and helpful information, fully illustrated and in color.

833. DIE STEEL. A new folder of the Crucible Steel Company of America, announces Airkool die steel, intermediate between the high carbon high chromium and oil hardening types in performance, and approaching the non-deforming and easier machining properties of the latter. Detailed data of physical characteristics are listed.

834. TOOLS and TOOL HOLDERS. A new general catalog No. C-39 of the Armstrong Bros. Tool Co. presents a comprehensive line of tool holders; carbon, chrome-vanadium and detachable head socket wrenches; C clamps; lathe and milling machine dogs; turret lathe and screw machine tools; ratchet drills; bits, blades and high speed steel; setting-up tools; machine shop specialties; and pipe tools.

835. ROCK DRILLS. The complete line of Ingersoll-Rand rock drills and associated equipment, together with a brief and interesting history of rock drill development, is presented in a new profusely illustrated 88-page catalog just published by the manufacturer. Installation and shop views as well as tables of operating and physical characteristics for each class of machine are presented in the volume. Individual sections are devoted to jackhammers, paving breakers, drifters, stoophammers, wagon drills, jackbits, drill steel, sharpeners (including thread forgers and shank and bit punches), jackmills and jackbit grinders and a variety of other equipment including core drills, diamond drills, submarine drills, etc.

836. LEAD PENCILS. To introduce their products, Reliance Pencil Corp. is offering free, a sample selection of 12 of the most popular types of wood cased lead pencils for office, factory and commercial use. Also available is an attractively illustrated catalog of the complete line of pencils, penholders and erasers manufactured by this company.

837. BRONZE BARS. A convenient reference listing of 329 stock sizes of cored bronze bars, ranging from ½ to 7¼ inches inside diameter, by 13 inches in length, has been issued by the Johnson Bronze Co. 8 pages, attractively printed in color and die-cut to simulate an actual bar, it is prepared on tough light-weight board to stand up under frequent handling, and is provided with a nail-hole for hanging on the wall. The data includes inside and outside diameter, wall thickness and approxi-

mate weight for each size. A feature of the line is that inside diameters are machined to within 1/32 inch of the rated size, leaving a 1/64 inch cut, thus saving time, tools and weight, and assuring concentricity.

838. SURFACE GRINDER. Bulletin H-V-1 of the Hill Clutch Machine & Foundry Co. illustrates and describes two new heavy duty hydraulic precision grinders, of the horizontal spindle and vertical spindle types. The equipment is adapted for production or special applications, on flat or irregular surfaces, such as machine tool beds and tables, hardened steel ways, die blocks, forgings, machine knives, stamping dies, pump bodies, locomotive guide bars, wheels, billets, pedestals, motor bases, machine slides, cams, surface plates, etc.

839. OPEN MESH EXPANDED METAL SHEET. Profusely illustrated, this 6-page folder of the Steel Products Division, U. S. Gypsum Co., suggests a score of applications for Shelf-X open mesh steel sheet, which is featured by flat surface, rigidity, and ease of fabrication. Originally developed as a shelving material for refrigerators, oven racks, and the like, it lends itself economically to a variety of other applications: grilles, auto aerials, baskets, trays and bins, safety guards, display stands, cages and crates, hampers, and utensils. Available in open hearth steel, chrome nickel steel, brass, copper or aluminum.

840. OVERHEAD TRACK SYSTEMS. Catalog No. A-64 of the Richards-Wilcox Mfg. Co. presents overhead track systems with a wide assortment of switches, brackets and appliances that make for complete flexibility of installation to meet every factory material handling requirement. More than forty photographs of accessories and typical installations are shown.

841. COSTOMETER. Bulletin No. 83 of the Simplex Time Recorder Co. describes the new "Costometer" which provides a speedy and accurate means of keeping accurate labor costs on every job. The instrument accommodates time cards, job tickets or slips of any length and width, and features convenient "one hand" electrical operation.

842. LEATHER CASES. A new catalog of the U. S. Leather Products Co. presents a complete line of hand luggage, leather goods and salesmen's cases, in standard and zipper models and in a variety of styles for business, school and professional use. The merchandising plan provides for individual purchases by employees through purchasing departments where the catalog is kept on file. 32 pages, printed in four colors, and illustrated with more than 200 cuts.

843. FLOOR RESURFACER. "Over the Rough Spots" is the title of a new booklet issued by the Stonhard Co., for maintenance and purchasing executives. It features a series of photographs of actual difficulties and plant problems, with quick answers for the correction and elimination of such conditions.

844. TRACING PAPER. A new folder of the Keuffel & Esser Co. introduces Albanene, a stabilized tracing paper of exceptional strength and transparency, with a fine drawing surface and good erasing properties, and particularly useful because of its permanence, due to the use of a new transparentizing agent—a crystal clear synthetic solid, free from oil and wax, unaffected by climate or age. The paper, available in three weights, will not lose transparency or become yellow or brittle with age.

(Additional listings on pages 8 and 10)

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GATE VALVE—FIG. 103
MORE ACCURATE • LASTS LONGER

RUGGED!

YOUR MAINTENANCE AND REPLACEMENT COSTS ON 150 LB. BRONZE GATE VALVES WILL BE CUT TO THE BONE BY THIS NEW VALVE . . .

Look for a reduction in your present maintenance and replacement costs on 150 lb. Bronze Gate Valves when you put this new READING-PRATT & CADY valve in service. . . Packing nut and gland; stuffing box connection; flange on hub; hub, finish band around hub; and hexes are heavier . . . The stem, neck and pipe threads are longer . . . These changes make this valve stronger, more accurate and easier to handle. There is no advance in price. *Write for complete details.*

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845. BUSINESS MACHINES. "Modernizing with International Business Machines," is a new 78-page booklet issued by International Business Machines Corp. In seven comprehensive sections it covers the field of electric bookkeeping and accounting machines (punched card method), time recorders and electric time systems, sound distribution systems, test scoring machine, proof machine for banks, tickettographs, and electric writing machines. More than sixty models are shown by photographs.

846. VARNISH REMOVER. A new folder of Felton, Sibley & Co. presents impressive testimonial evidence of the performance of I.C.D. Formula 9 remover for paint, varnish, shellac, enamel and lacquer, and for cleansing metals before painting. The remover will not burn or explode; will not injure fabrics, wood, leather or metal, raise the grain of wood, or leave a waxy film.

847. METAL SHEARS. Of particular interest to those faced with metal shearing problems is a 28-page catalog (No. S-2) of the Cincinnati Shaper Co., illustrating and describing the complete line of Cincinnati all steel shears. It gives the details of the micrometer back gauge, hydraulic holddowns, safety drive, and other features; also a wide variety of optional equipment such as power back and front gauges, electric clutch control, etc.

848. THIN PAPERS. When you know the correct grade of thin paper to specify for various office and factory uses, you'll save time and money and get better results. Valley Paper Company's "Thin Paper Efficiency Chart" which you can place under your desk glass or hang on the wall, gives you this complete information in a handy, easily-referred-to form.

849. WEIGHT CALCULATOR. For rapidly determining the weights of forged square, round, hexagonal and octagonal flats and bars, forged rings and blanks, the Kropp Forge Co. has prepared a handy calculator on the slide rule principle giving a direct reading, without computation. It is necessary only to know the dimensions of the forged shapes covered by the device, which is a helpful time saver for all uses of forgings.

850. UTILITY TOOL. "The Tool of a Thousand Uses" for pulling, pushing, spreading, bending and clamping, useful with spoked and plate center wheels, pulleys and gears, is shown in Bulletin P & P40 of Templeton, Kenly & Co., with numerous illustrations showing the tool at work in various typical applications.

851. SAFETY EQUIPMENT. A new catalog of industrial safety equipment is announced by the American Optical Co. It describes in detail a complete line of goggles for protection against impact, glare, splashes of liquids and particles of dust; welding helmets, face shields and respirators; safety gloves, suits, sleevelets, leggings, aprons, hats and hoods—providing protection from head to ankles.

852. WOVEN WIRE SCREENS. Catalog No. 82 of the Ludlow-Saylor Wire Co. is a complete treatise and reference book on wire cloth and woven wire screens in all grades and weaves, of all commercial metals and alloys, and for all purposes. Its 72 pages, conveniently assembled with plastic spiral binding, contain a wealth of information on the selection and characteristics of standard and special constructions, illustrations, and dimensional tables. Featured is Super-Loy, an economical steel for heavy-duty applications.

853. GUMMED TAPE. The proper sealing of packages with the correct gummed tape applied skillfully has its benefits in both efficiency and economy. "Helpful Hints on Sealing Methods" is the title of a 4-page folder being offered by Moore & Thompson which gives much information on this subject.

854. ALLOY DATA CHARTS. A new series of alloy data charts designed to permit a quick easy selection for the proper heat treatment for your job has recently been developed by Peter A. Frasse & Co., Inc. Each alloy bar shipment is accompanied by a chart listing physical properties obtainable at drawing temperatures from 800° to 1,300°, at 100° intervals, for both the low and high side of the steel's carbon content. In addition, the effect of increased mass (up to 5" dia.) is shown for the 1,000° draw.

855. DOUBLE DUTY CARBON PAPER. Sample sheets of Old Town Ribbon & Carbon Company's new "Double Duty" carbon paper illustrate the adaptability of this special sheet for both standard and noiseless machines. The new paper is offered in 4, 5½ and 7 pound weights.

856. THIN PAPERS. The new sample book of thin papers just completed by Esleeck Mfg. Co. contains samples for use as record forms, letterheads, copies, advertising, legal documents, air mail, branch office and foreign correspondence. It contains a variety of samples of weights, finishes and colors, and grades ranging from 25% to 100% rag content.

857. SAFETY EQUIPMENT. A comprehensive 106-page 8½"x11" loose-leaf catalog recently issued by Pulmosan Safety Equipment Co. covers virtually all industrial safety equipment requirements. Some of the numerous products illustrated and described are respirators of all types and for all purposes, hoods, helmets, masks, goggles, gloves, welding shields, safety ladder shoes, leggings, aprons, inhalators, fire-fighting equipment, first aid kits and supplies, safety shoes, foot guards, safety belts, salt tablets, etc.

858. SHIPPING CONTAINERS. In a 16-page booklet that is literally "packed with packaging ideas," the Hinde & Dauch Paper Co. illustrates and describes twelve typical examples of successful "profit packages" which are defined as "any container that helps to increase the sales of a product." The booklet is devoted to pointing out how attractive packages are important to good will and increased sale of merchandise.

(Additional listings on pages 6 and 8)

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Company

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*Have you ever
looked behind
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order?*

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GRAYBAR ELECTRIC COMPANY,

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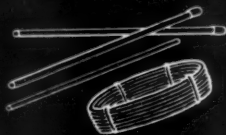
DESCRIPTION OF MATERIAL

VICE OF THE GRAYBAR ELECTRIC
SIGHT DRAFT AND INTEREST AP

TO

ORDER

WIRE & CONDUIT



CABLE



WIRING SUPPLIES



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You get the full benefit of a well-stocked Graybar warehouse located nearby.

You get prompt "action service" to bring you the products you need *when* and *where* you need them.

You get the services of Graybar men trained to serve you quickly and intelligently — men experienced for years in meeting needs similar to yours... specialists in lighting... wiring... motor applications, etc.

You get—in Graybar—a responsible, permanent, and convenient source of the 60,000 electrical products of more than 200 outstanding electrical manufacturers. What a convenience for busy Purchasing Agents to see only one man representing 200 lines!

You get—when you buy from Graybar—the assurance and support of Graybar's 70 year reputation for satisfying its customers.

Purchasing Agents who have dealt with Graybar for years place a high degree of importance on these "plus values." Why not try Graybar on your next electrical order and judge these "plus values" yourself?



Yours on Request

Purchasing agents will find it well worth their while to read the publications reviewed on this and the preceding pages. From among the many submitted to us, they have been selected by the editors as having greatest interest and utility value to purchasing agents.

To obtain copies, simply fill in and mail coupon at the bottom of this page.

859. VALVES. The refinement of valve designs to match specific needs of each service condition has of necessity resulted in complicating the task of valve selection. Recognizing this fact, Crane Company has issued an 8-page folder entitled "Service Characteristics of Globe Valves and Gate Valves—How to Pick the Right One Every Time," designed to help the user select the proper valve for his particular service. Two charts in addition to many cutaway diagrams assist in this purpose.

860. MACHINING TOOLS. A new chart giving the correct grade of Kennametal for machining twenty-one types of metals, together with recommended cutting speeds, has just been made available by McKenna Metals Co. Materials listed include carbon steels, nickel chrome steels, nickel chrome molybdenum, chromium steels, high speed steels, Monel metal, free cutting steels and non-ferrous metals, in various states of hardness. The reverse side of the chart contains practical data on machine operations—turning, facing, and boring—and includes two designs for grinding tools to produce crescent shaped chips or coiled chips as desired; also, the correct tool shape for interrupted cutting with Kennametal. The new chart is printed on durable varnished cardboard stock and has a hole punched at the top so that it may be easily hung from the wall or lathe.

861. CHAIN AND CABLE. It is always of advantage to know where a product desired is available. It is with this in mind that the American Chain & Cable Co., Inc. have prepared a 12-page booklet listing the principal products of the several divisions of the company. Two pages of the booklet are devoted to an alphabetical products index, the page numbers of which refer to the company division manufacturing the product. Also listed in convenient form are the sales offices and their addresses.

862. STEEL STRAPPING. An interesting 24-page booklet which has as its keynote, perfect shipping, is that published by Signode Steel Strapping Co., giving many helpful hints and suggestions on shipping problems. Articles on shipping practices and methods are included and the many fine photographs vividly portray the results of both good and bad packing.

863. CASTINGS. An attractive 24-page booklet which purposes to acquaint manufacturers with the company's facilities for producing castings of any size, shape or quantity, has been prepared by The Forest City Foundries Co. The booklet pictorially tells the story of the foundry, showing by means of actual photographs the operations in the making of castings.

864. TAPS AND DIES. A new and larger edition, comprised of 144 pages, is the new catalog just issued by Winter Brothers Co. Data on their complete line of taps, dies, and screw plates is given together with useful shop information and commercial standard tables frequently referred to by mechanics.

865. PRECISION GRINDER. Detailed information on a precision grinder for tools such as bits, dies, cams, bearings, screws, jigs, gun parts, etc., is found in a well illustrated folder just issued by The Dumore Company. This tool which is accurate to .0001", has many applications, several of which are illustrated. The many outstanding features of the grinder such as wick and tape thrower lubrication, spindle speeds from 6,600 to 38,500 r.p.m. and automatic belt adjustment are described in the interesting folder.

866. GUMMED TAPE. Unusually attractive, convenient and informative is the Central Paper Company's booklet, "Safetex—Geared to the Box," a handbook on gummed tape and its application. Mounted on plastic ring binders, with stiff cover to lie flat, the booklet has a colored and cut-tab index giving instant access to 12 concise and well illustrated sections. Of special interest is the Safetex glue surface grooved for perfect moisture distribution, faster and firmer sticking; trouble shooting in the packaging department; moisteners; freight and express requirements.

867. STEEL DATA BOOK. Joseph T. Ryerson & Son are now distributing a new general data book on steels and steel products, containing metallurgical definitions; heat, hardness and numerical equivalent tables; weight, dimension and specific gravity tables; manufacturing tolerances; safe load tables; standard specifications for reinforcing bars, boiler tubes, plates, bridges, etc. A valuable reference book for every buyer's desk.

868. SCREWDRIVERS AND BITS. A 12-page combination catalog, manual, and price list on Apex-Phillips screwdrivers and bits for electric, air, and spiral drivers is offered by the Apex Machine & Tool Co. Designed to supply purchasing agents, tool supervisors and production engineers with detailed information regarding drivers for Phillips recessed head screws and slotted head screws, two tables are given for determining the correct bit size for Phillips wood, machine, and sheet metal screws and stove bolts and for flat, oval, binding and round head slotted screws. Power bits are illustrated for 32 makes and styles of power drivers as well as hand drivers.

869. BUSINESS CARDS. To purchasing agents of well rated firms, using 10,000 or more business cards annually, the Relief Printing Corporation offers a sample unit of 250 Relief Process Business Cards packaged in their attractive and economical Card-Savers. The cards will be accompanied by a description of this firm's "National Business Card Service" which has been used by many representative sales organizations for over 25 years. It is only necessary to accompany the coupon with a sample of your present card and indicate your approximate total annual requirements.

870. SAFETY STEEL STAMPS. A new circular of the M. E. Cunningham Co. illustrates a variety of holders and interchangeable type for marking flat and curved metal surfaces, hot billets and slabs, cold billets, heavy castings and rolls, etc. The line is featured by design and analysis to provide safe and serviceable stamps, that will stand up under heavy duty without spalling or mushrooming.

(Additional listings on pages 6 and 8)

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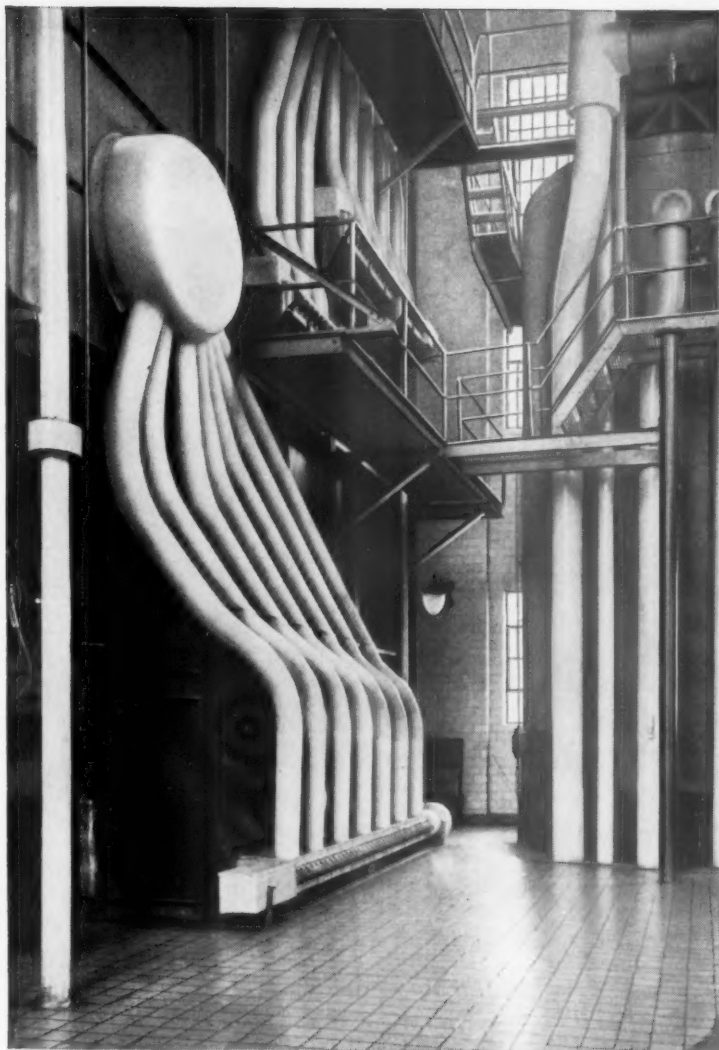
Company

Address

City State

PAGE 10

PURCHASING



Drum ends, water wall piping, and headers in Seagram's Louisville distillery, showing K & M "Featherweight" 85% Magnesia insulation in use.

K & M INSULATION plays a part in making **Seagram's** FINE WHISKIES SINCE 1857

Process temperatures in a distillery must be accurately controlled. Heat must be efficiently conserved. In the Louisville, Ky., distillery of Joseph E. Seagram & Sons, Inc., large quantities of Keasbey & Mattison heat insulations are used for these two essential functions. This is natural, for Keasbey & Mattison has spent more than half a century in the development of specialized insulation products and in their application to every industrial need.

Established more than 65 years ago, the Keasbey & Mattison Company pioneered in the development of Asbestos and Magnesia products, originating many of the most efficient forms of insulation in widespread use today.

Because of their superior properties, K & M products brought new economies to countless industries, and this Company rapidly grew to a national institution with nation-wide facilities. Today, Keasbey & Mattison is one of the manufacturing leaders of America. K & M engineers, working with K & M Distributors strategically located throughout the country, can point the way to real savings in your plant, too. Why not write Dept. 11 for further details?

K & M

ASBESTOS AND MAGNESIA PRODUCTS

KEASBEY & MATTISON

COMPANY, AMBLER, PENNSYLVANIA

Keasbey & Mattison's long experience in providing industrial plants with high efficiency heat insulation for specific conditions has kept us closely in touch with the problems of the buyer. The policies of K & M Distributors are coordinated with those of this Company to insure your maximum satisfaction. Emphasis is placed upon a constructive insulation service to meet your needs, in which the high quality of K & M materials plays an essential part. For dependable products and intelligent service, you can rely upon your K & M Distributor.

SEE K & M's FIERY SNOWMAN AND EXHIBIT IN THE HOME BUILDING CENTER AT THE NEW YORK WORLD'S FAIR



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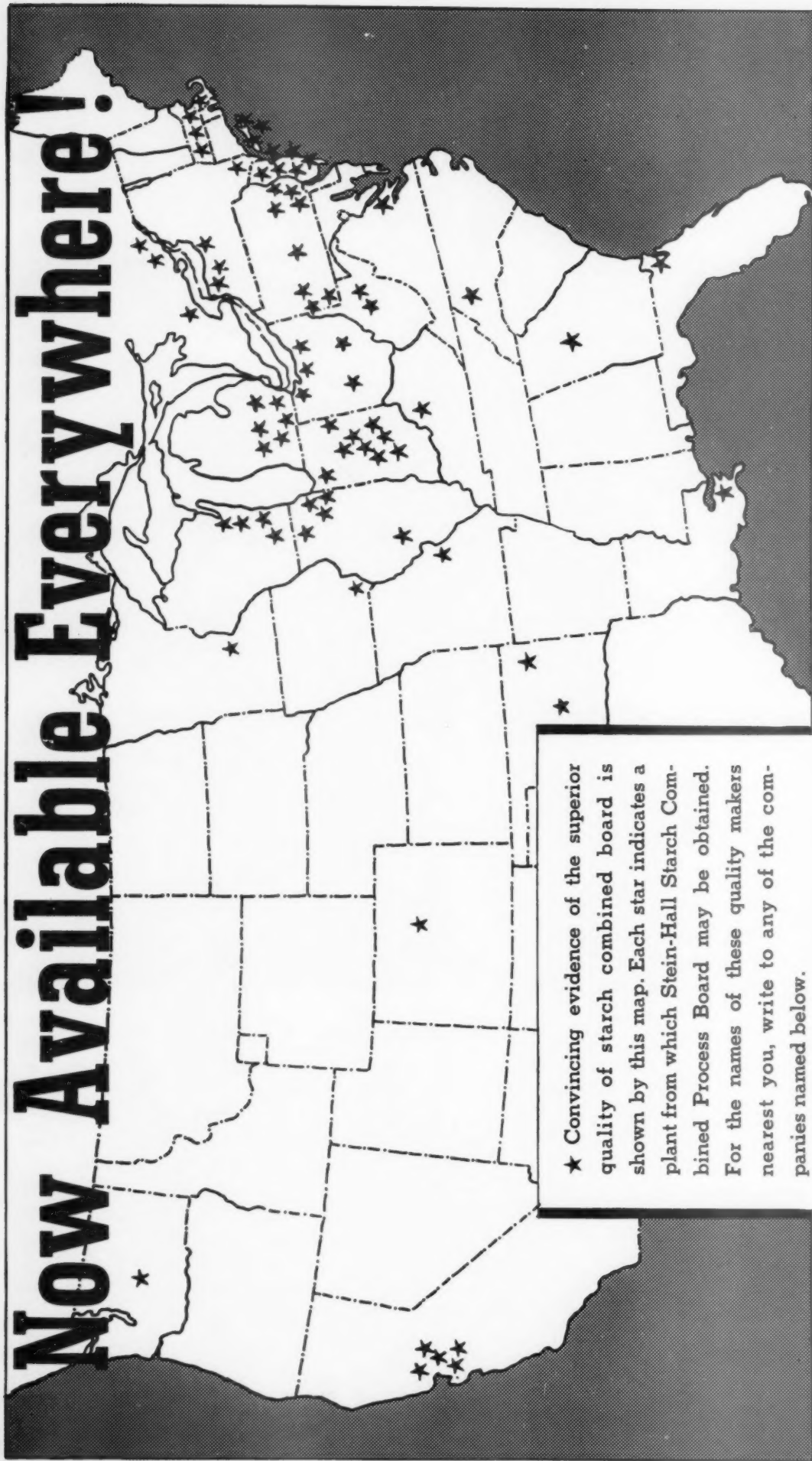
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RYERSON

"Worth Less Than Nothing"

UNDER the above title, our contemporary, "Product Engineering," uses the lead editorial of its August issue to indict the purchasing agents of industry as penny-pinching price buyers, and to caution the engineering department against becoming "over-zealous in its desire to cooperate with the purchasing department."

The familiar example is introduced. An infinitesimal saving on glue in an unnamed company, suggested by the purchasing agent (and approved by the engineer), spoiled a thousand dollar product and lost incalculable good will for the company. Accepting the story at its face value, if it proves anything at all it proves only the undebatable fact that human judgment is occasionally fallible, whether among purchasing agents or product engineers. It is scarcely a sound basis for disparaging the whole purchasing function and all purchasing agents as having "negative value" to their organizations.

The attack is not new. It has come frequently, before this, from engineering publications. The current blast was circulated not only to 9,000 engineers, but, we understood, it went in reprint form to sales and advertising managers in a none too subtle invitation to "go over the p.a.'s head" in industrial merchandising.

It is not so much a slur upon purchasing men as upon the good sense of management itself, which finds centralized purchasing a most potent and economical means of organization. That fact is established by a consistent record of growth and authority in purchasing. To disparage that trend is willful blindness to the development of management science.

Most insidious and destructive is the attempt to build up dissention and conflict of authority within a company, when all factors should be working together for the good of the organization.

Large scale industry is necessarily built upon the coordination of specialized talents and responsibilities. Successful industry needs competent engineers and competent purchasing men, both "zealous to cooperate" for the good of the company.

The true picture of progressive management policy today is given in a recent analysis of purchasing practice, covering hundreds of the most successful companies. These facts show that 96% of the purchasing executives have the authority to question the quality of a specified item; that in 90% of the companies, individual purchases are not reviewed by management; that in 74%, the purchasing department serves as a medium for obtaining the product information used in research; that in 67%, the purchasing department is represented in the discussion of production plans. 96% in this study testify to a high degree of cooperation with other departments.

There is no essential conflict between two diverse functions. There is nothing to be gained by setting up antagonisms and making it more difficult for the respective executives to do a competent job. But if this is to be an issue, let it be considered on the basis of the complete facts, not on the basis of an isolated, ridiculous, and anonymous incident. Purchasing and management unite in challenging that baseless attack.

STUART F. HEINRITZ, EDITOR

WAR SHADOWS

over the

AS the threat of war has been succeeded by the actuality of war, a new and very important factor has been injected into the commodity markets and the problem of industrial supply. Purchasing men who went through the experience of buying during the World War, and those newer in the field, who have studied the course of prices and supplies, of regulation and extraordinary business conditions during that period, do not need to be reminded that similar conditions and difficulties lie in the days ahead and may develop with startling speed.

The present situation differs from the previous one in that there has been a protracted period of preparation. Perhaps never, and certainly never in modern times, has a war period been so deliberately entered upon. There has been ample time to get used to the idea, and to prepare for its eventualities so far as they could be foreseen. The governmental organization for control of the industrial materials and resources necessary for war-time operation, either as a neutral power or an active participant, is most complete, and has been effected with thorough coordination between government and industry.

The course of individual markets has been divergent, and specialized knowledge is required for a logical forecast in any particular field. In general, no drastic shortages have been expected, such as might cause a serious paralysis of production and trade. The N.A.P.A. Business Survey Report issued late in August, on the eve of hostilities, still indicated a conservative inventory and buying policy. The situation is to be taken in stride.

The seasonal factors, especially with production of new automobile models just getting under way and the necessity of supplying dealers with the new stocks, is expected to cushion the first impact of the European conflict on our manufacturing industry. In the series of crises which have characterized the past months, retail trade has shown itself relatively independent of foreign developments, which augurs well for the manufacturers of consumer goods. The consensus among business leaders is that the initial economic shock of war upon this coun-

try will be less severe and shorter-lived than in 1914.

Domestic Sources Have Been Developed

One important consideration is the progress that has been made in the development of domestic sources on materials for which, as recently as the World War period, the U. S. was dependent on foreign supplies. While the possible difficulties in this direction must not be underestimated, it is conceded that we are far better equipped today to cope with such emergencies through new sources or adequate and available substitutes.

This is particularly true of chemicals and textiles, and extends into other fields as well. Some typical instances are as follows:

WOOL. The American clip has increased 50% since 1926 and there remains a good opportunity for further expansion, with active projects to this end currently conducted by manufacturers in conjunction with agricultural schools. Acceptable substitutes include a larger proportion of rayon waste in clothing and a new, permanently crimped acetate staple fiber for blankets.

BURLAP. There is no domestic production, and supplies will presumably be cut off or seriously delayed. Our large surplus of cotton, however, is available for most uses, with ample mill facilities. This substitution already exists on a considerable scale.

SILK. The substitution of Nylon has been widely publicized for some months past, and production should be on a commercial scale by the first of the year. Rayon and acetate yarns are available for woven products and hosiery.

DYES. The U. S. was wholly dependent on Germany in 1914, but is now more than 98% self-sufficient, and some of these products are adaptable as tanning materials, though at an increase in cost.

POTASH AND NITROGEN. Development of southwestern potash-yielding deposits has raised the domestic supplying of requirements from 8% in 1926 to 52% today. In nitrogen and phosphate production, similar developments, spurred by the great Muscle Shoals project, have made the U. S. capable of supplying its own needs even though imports of the native product from Chile may be curtailed.

CAMPHOR. The importance of camphor as a plasticizing agent in the manufacture of nitrocel-



COMMODITY MARKETS

lulose plastics is waning with the development of new types of plastics. It is being made synthetically from turpentine, with an annual production now amounting to a million and a half pounds.

COTTONSEED OIL has been developed as a useful substitute for several of the imported vegetable oils.

IODINE is successfully produced here from brine, and though the U. S. is still predominantly an importer of this important material, it is less dependent on the foreign sources, and the industry can be further expanded, at a somewhat higher cost.

MERCURY. About half of current needs are domestically produced. Half of the imports could be replaced by domestic substitutes, such as lead oxides, suitable for some of its applications. Sharp price advances would be required to stimulate further domestic production.

SHELLAC. Synthetic resins provide acceptable substitutes for many uses, and have already made progress under normal peace-time conditions.

TIN. Stainless steel and aluminum have replaced tin for many industrial uses, with cost economies, and this development can go much farther. For motor bearings, cadmium has replaced tin to a considerable extent, with quality advantages and a reasonably close price ratio. For use in containers, paper and glass are entirely practicable substitutes in the majority of cases.

MANGANESE. Commercial deposits have been found widely distributed in this country — on a commercially practicable scale in ten states, with lesser amounts in twenty other states. The ore is low grade, running 50% leaner than imported ores, with consequently higher costs for refining. Additional deposits are being developed in Cuba and South America, which would presumably be available in wartime. Mexico is also furnishing a considerable quantity of antimony-bearing ores, which are now refined in this country.

Classification of Materials

A significant guide to the materials most likely to be affected during wartime is afforded by the classification drawn up by the Army and Navy Munitions Board. This sets up three general groups on the basis of their importance in a national defense program and the conditions governing their procurement. It is important to note that any item may be transferred from one classification

to another as changing conditions warrant a review.

STRATEGIC MATERIALS. The first group, designated as strategic materials, comprises those for whose supply, in wartime, the U. S. is dependent in whole, or in part, on sources outside its own continental limits. For these, strict measures of conservation and distribution control are deemed necessary. The list includes:

Aluminum	Quartz crystal
Antimony	Quicksilver
Chromium	Quinine
Coconut shell charcoal	Rubber
Ferrograde manganese	Silk
Manila fiber	Tin
Mica	Tungsten
Nickel	Wool
Optical glass	

CRITICAL MATERIALS. The second group of materials entails procurement problems, still difficult, but less serious than in the first group. This may be due to the possibility of domestic production, to the availability of more adequate supplies, or to a less important position in the defense scheme. Some degree of conservation and distribution control may be necessary. This group includes:

Asbestos	Nux vomica
Cadmium	Opium
Coffee	Phenol
Cork	Picric acid
Cryolite	Platinum
Flaxseed	Scientific glass
Fluorspar	Tanning materials
Graphite	Titanium
Hides	Toluol
Iodine	Vanadium
Kapok	

ESSENTIAL MATERIALS. The third group includes materials for which no special procurement problem is now anticipated, but which, due to their importance in national defense, may require a later reclassification to one of the other groups as conditions change.

Government Buying

Aside from the intrinsic interest of this classification is the procurement program that is already under way on these materials. The Thomas-Faddis Act passed during the last session of Congress initiated a four-year buying program designed to build up adequate stocks of such materials, and contemplates the expenditure of \$100,000,000 to this



end. Of this fund, \$10,000,000 has already been appropriated, and is to be expended by the Army and Navy Munitions Board, in conjunction with the recently formed War Resources Board, which adds the viewpoint and advice of private industry. The first purchases, this month, are to include manganese, chromium, tin and tungsten, all of which are in the "Strategic Materials" group.

While this technically places the government in the position of competing with private industry as a large buyer in these markets, which would be among the first to reflect war conditions, such is not the intent. The Act states as its second purpose: "(to) encourage private industry to develop sources of such materials which are known to exist here." A "reasonable differential" in favor of domestic industry is also allowed as a practical measure of fostering, if not actually subsidizing, such production at this stage.

At the same time, Congress has authorized the Bureau of Mines and the Geological Survey to engage in exploration and study of domestic sources, and particularly to improve present methods of extracting materials from low grade ores, by less

The War Resources Board, pictured at its first meeting, August 17th, with ranking officers of the Army and Navy, to formulate plans for rapid and efficient mobilization of the nation's industrial and economic power. Seated, left to right: Dr. Harold G. Moulton, President of Brookings Institution; Charles Edison, Acting Secretary of the Navy; Edward R. Stettinius, Jr., Chairman of the Board of the United States Steel Corporation, and Chairman of the War Resources Board; Louis Johnson, Assistant Secretary of War. Standing, left to right: Commander A. B. Anderson, Navy liaison officer to the board; Admiral Harold R. Stark, Chief of Naval Operations; Dr. Karl Compton, President of Massachusetts Institute of Technology; John I. Pratt, Director of General Motors Corporation; General George C. Marshall, Chief of Staff, U. S. Army; Colonel Harry K. Rutherford, U. S. Army, Secretary to the Board. Walter Gifford, President of the American Telephone and Telegraph Company is also a member of the Board, but was absent from this meeting.

costly processes. An appropriation of \$500,000 was made for this purpose, and qualified experts for the work are being selected by the Civil Service Commission. In this study, costs of the materials are considered of less importance than to attain positive knowledge of the quantities available in the case of an emergency. If the deposits are suffi-

ciently large, low grade ores will not be overlooked.

Transportation

During the World War, transportation difficulties ranked among the chief concerns of the purchasing officials. Essential supplies were known to exist which were nevertheless unavailable because of the interruptions to normal transport, the delays and uncertainty of shipment, and the hazards of loss in transit. That will again be a major factor. Distribution facilities will be the key to many commodity situations, rather than the overall statistics of supply which guide the buyer in normal times.

The situation regarding merchant marine tonnage has undergone important changes in the past twenty-five years. World tonnage has increased by 40% in that period, and a very substantial part of that increase has been among the nations that are

endeavoring to maintain neutrality in the present conflict, and who may be expected to play a major role in the carrying of commercial and industrial commodities.

The United States itself has tripled its merchant marine during the same period. The same is true of Japan and the Netherlands. Greece and Norway have doubled their tonnage, and substantial gains have been made by Sweden and Denmark. Thus there is a marked increase in available facilities for bringing in essential materials, but there are important reservations to be made before accepting this statement.

One of these is the obvious fact that it will not all be available for U. S. buyers. It can only be said that in general there are greater facilities for carrying on such commerce, and that this country will benefit proportionally, plus having the direct advantage of its own increased tonnage.

The second proviso concerns the very debatable issue of whether the ocean lanes can be kept open for such traffic. The experience of the World War makes this very questionable. It is reasonable to believe, however, that the ocean ways connecting the United States with Central and South American suppliers can be adequately served, and, with some further reservations, the lanes to the Orient.

Location of Supplies

This suggests a factor of vital importance for the purchaser's consideration—namely, that the location of supplies, rather than a mere quantitative summary of stocks, is the real key to commodity markets in the present situation. For most basic raw materials, there are accepted statistics on world supplies which have been useful as market guides. But a great deal of their normal value is now lost, and each individual market now requires a complete reappraisal as to its statistical position as the latter is modified by the practical availability of the stocks.

The geographical location of stocks normally available in world trade may take them out of the market as completely as if they had never been produced. Channels of distribution become the governing factor. Even though neutrality is maintained and commercial relations are nominally open, actual supply from many such sources may be practically ruled out. New sources and new channels will have to be developed.

War Prices

Prices have already rocketed in a speculative and covering wave immediately following the Labor Day week-end. As to domestic prices, the President has stated that profiteering will not be tolerated. That implies some definite measure of governmental control of prices and profits, and widely varying degrees of such control are possible. This is not an immediate factor, but one which must

have a part in any consideration of the situation. An opinion from Washington, following the declaration of United States neutrality, is as follows:

"Unless President Roosevelt at an early date convenes Congress in extraordinary session to revise the neutrality law, machinery to clamp down on profiteering may not take shape for months. The tie-up between a special session and the program for federally-sponsored price pegging results from the certainty that new legislation will be required to supplement such statutory authority as now exists for moves in that direction. Attorney General Murphy, whose task it will be to see that commodity prices do not soar too far from normal, intends to move only so fast as the date of a special session may require. There is nothing emergent in the present situation, his aides explain.

"Practical difficulties also beset the path of the new policy, Justice Department spokesmen point out. A searching examination of all existing law must first be made. Legal power to place a ceiling over prices is expected to be found on the statutory by-ways rather than on the highways. In other words, there is not yet to be found any law which has price controls as its principal feature, but there are believed to be numerous statutes in which such a policy appears as incidental to the main purpose sought to be accomplished.

Price Controls Must Be Based on Comprehensive Studies

"The Attorney General already has assigned a staff of attorneys to make the search and report to him. The Treasury, Commerce and Agriculture Departments have indicated their willingness to make independent studies and supply experts for round-table discussions which will follow. The Department of Justice will not move independently, but will act only after the four separate reviews have been completed and analyzed.

"Until it is known precisely what legal price controls now exist, it will be impossible to forecast what form the proposed new legislation will take, what its breadth will be, or what system of administration will be employed. At least one Congressional bill is in existence to serve as a possible guide. It is the May Bill, designed to take the profits out of war. Submitted more than a year ago, it has not reached the stage of committee hearing. The May Bill was to become applicable only in time of war in which the United States might be a combatant. It proposed an absolute price control, to be vested in the President. It was the absoluteness of executive price pegging which prevented that bill from receiving committee consideration. If the administration takes heed from that experience, it is certain that control of profiteering under the proposed new machinery will proceed from scientific bases, embracing cost studies, problems of distribution, and other economic factors."

Shall We Do This Construction Work



ourselves
or
Contract
It

(Photo by Ewing Galloway)

NO DOUBT the question indicated by the title of this article is one that at one time or another most plant executives have had to answer. Presumably also, many of them, at the completion of the job, were still in a great deal of doubt as to whether or not they selected the right course, irrespective of the method that they chose.

In attempting to find the answer to this much discussed subject, it might be well to reconsider that the object of any business is to make a profit on the capital invested. Therefore the correct answer is one that will, at least, prevent a loss.

It is true that there are special cases where other factors at the moment seem more important than this, but in the final analysis every decision is based on the principle of profit making.

Whether or not doing one's own construction will be profitable will, of course, depend a great deal on the type of business, its size and extent, the personnel available, whether the work to be done is an addition to existing plant or new plant, the complexity of the work, and other factors that come

"New construction work is essentially a purchase...."

*J. M. Knowles
at the N.A.P.A. Convention
May 1939*

to mind in each specific case that comes up.

Again, before management can decide on this vital matter

The answer usually lies in comparative costs, and that in turn implies fairly accurate knowledge of overhead charges and profit margins. Here is pertinent data casting some light on the subject.

they must know their own plant costs and be able to place them on a comparative basis with figures that may be presented by contractors. This is not such a simple matter as appears on the surface, and in the experience of the author, has been the source of more wrong decisions than any other factor.

Few operating plants maintain their books and accounts in a manner which permits comparative costs to be made, for the very reason that the operating or manufacturing system requires many items of overhead and other operating burden, such as depreciation, to be added to plant costs. If these items, which ordinarily do not appear on the contractor's books, are not taken into consideration, management starts out immediately by securing a false and distorted picture of the entire matter.

It is quite true, of course, that the plant manager, as a rule, is not familiar with construction costs, and finds it difficult to reconcile his own figures with those of the contractor, the details of which are not available to him.

It is also true that few contractors are interested in exposing the factual and detailed figures to a client, when he knows that if he told the client the truth he would, in many cases, lose the work. He realizes quite fully that few clients will appreciate and take into consideration that there is such a thing as good construction and poor construction, as there is cheap poor clothing, and good and medium priced clothing. The lowest bidder will take the contract in the majority of cases. Therefore, it is up to the contractor to be low, or to persuade the client that for the class of work that he is going to get, his is the better price.

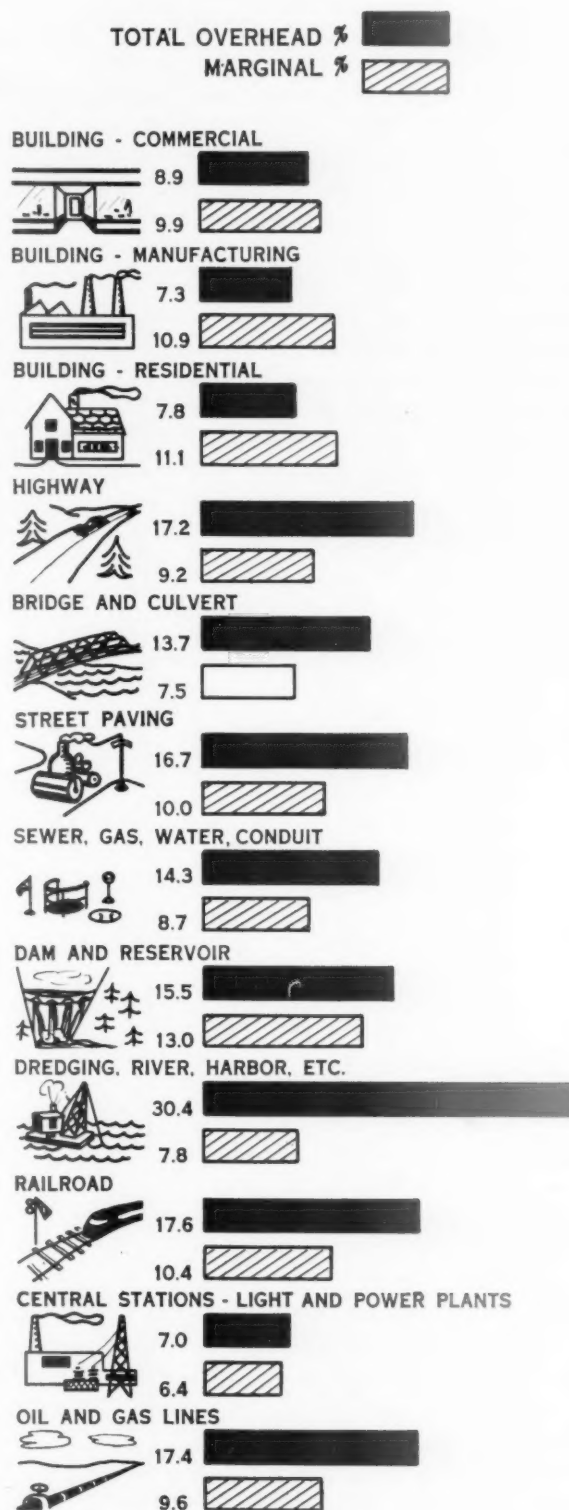
The very system of contract bidding, without due consideration that a man is worthy of his hire, defeats itself—a statement which can be established by the proven statistics that ninety-eight or more out of every hundred contractors go broke eventually, if they operate strictly on the competitive method.

This opens up the question as to what might be considered a fair return for a contractor on work of different volume, what his overhead actually is, how his costs are distributed, etc. A preview of some of these facts may give the plant executive some background for comparing them with the burden which his books add to the actual labor and material in the job.

The 1930 Construction Census is the most comprehensive compilation that has been made in the building industry. Reference to this survey is made in the 1935 edition of *Construction Costs*, published by the *Engineering News Record*. The total cost of the structures built in 1929 included 31% for direct labor, 7% for salaries, 44% for materials, and installed equipment, 11% for equipment (Contractors) depreciation, insurance, bond, rent, etc. and 7% for profit. Since that time the Social Security taxes must be added to overhead items. The gist of the combined general and subcontractor ratios—Labor-Material-Overhead—as computed from the Construction Census of 1930, and some pertinent figures on overhead and margin from the same source are reproduced in the charts herewith.

Examination of the detailed figures, for the classes of work shown, requires that the percentages for the item of "Salaries" and "Other Overhead," must be combined in order to secure what is commonly considered, from the plant executive's viewpoint, as total overhead. Under the classification "All Building Contracts", the total is 15.3% of total expenditures. The total undistributed balance, calculated as profit, is 9.5%, making a grand total of 24.8% for overhead and profit. These figures are the average for 26,671 companies.

REPRESENTATIVE CONTRACTORS' RATIOS FROM CONSTRUCTION CENSUS U. S. BUREAU OF CENSUS



"Building alterations come under the jurisdiction of the purchasing department. On such a requirement, not only are general proposals invited, but the various subcontracts as well are made the subject of competitive bidding. Thus the Supervisor of Purchases himself is in the position of a general contractor with a competitive estimate on the complete job. It frequently happens that his bids on the various component parts of the job offer enough economies to warrant handling it in this way. In other cases, a general contract may be let."

—How N. Y. U. Buys
(PURCHASING—October 1937)

If engineering is performed, this will also have to be added to the above overhead items, which may add from 5% to 10% additional, depending on the amount of complex and detailed mechanical work that is required. Social Security will add further to the total.

Without engineering charges, but including Social Security, it is obvious from figures on over five billions of dollars of construction, that the contractor's overhead and profit will amount to not less than 28% of the total expenditure.

Most contractors will deny that their overhead charges in practice reach these amounts, and if they actually figured them as an addition to their labor and material, they would never secure a contract. Unfortunately there is a great deal of truth in this statement, and it is the main reason why all but 2%, or less, eventually end up in bankruptcy. This is a startling fact that can be confirmed by any bankers' association.

As a background for management in establishing a fair price for work to be done, it appears that calculating the labor and material in the work, plus the overhead and profit named, is not at all out of line. This fair price can therefore be considered as a bogey by which to consider the possibility of performing the construction with plant forces.

Assuming that the plant forces work, and that there are no real are competent to perform the obstacles to prevent them from doing so, the decision as to the proceeding may be made solely on the economies of the situation. The fact always remains, however, that taking competitive prices may

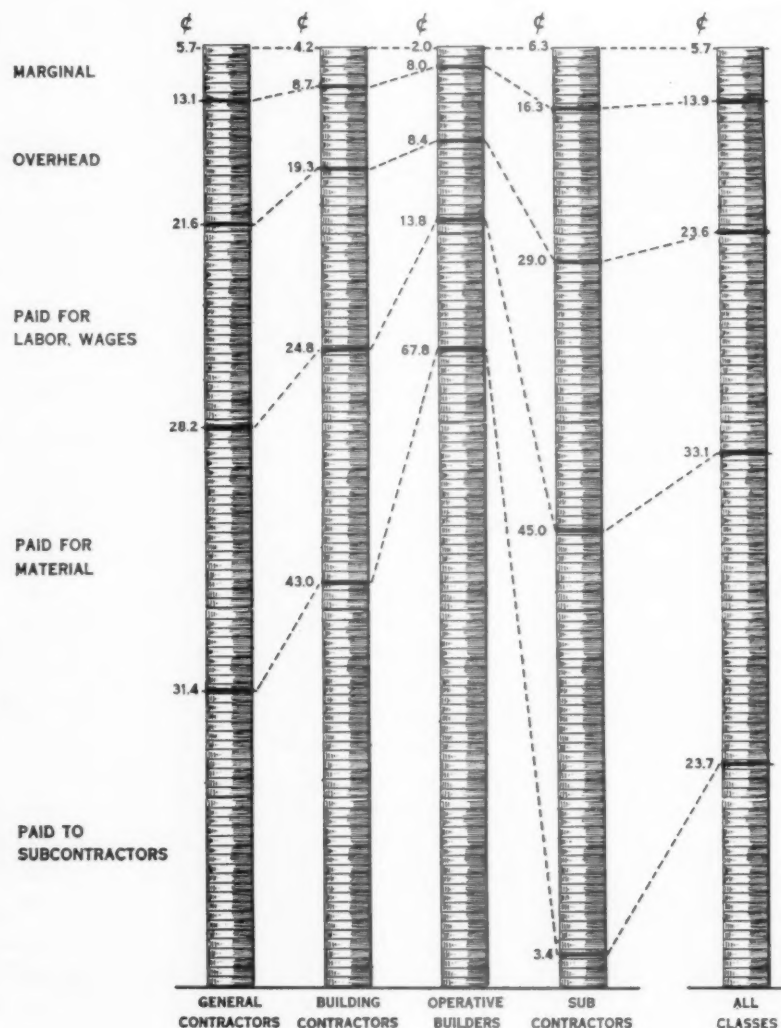
bring out, and it usually does, some contractor who figures that he can beat the game and present a price lower than the situation warrants.

Another means of checking the overhead and profit amounts which are to be considered as fair returns, from the contractor's viewpoint, are the percentages for Cost Plus and Fixed Fee Contracts used by the Associated General Contractors. A figure of from 2 to 10% of the net cost of the work is generally used in order to guarantee an estimate. This must be added to the fee percentage, if the contract is of the guaranteed maximum type. In the lump sum form of contract, where the cost is also definitely guaranteed, allowance is made for this in the overhead and profit items. It is quite obvious that the total volume of work has a considerable bearing on the total burden to be added to the cost.

Continued on page 76

LABOR, MATERIAL AND OVERHEAD IN THE CONSTRUCTION DOLLAR

FROM CONSTRUCTION CENSUS
U. S. BUREAU OF CENSUS



THE PURCHASE OF AUTOMOTIVE EQUIPMENT



3: Laws Affecting Truck Sizes and Weights

R. E. PLIMPTON

THE fleet operator hauling his own property in general requires three different kinds of motor trucks, namely:

- (1) The 4-wheeler, cab and body mounted on two-axle chassis:
- (2) The 6-wheeler, cab and body mounted on a three-axle chassis, with two axles near the rear.
- (3) The tractor semi-trailer, a 4-wheeled motor unit supporting and towing a single-axle trailer unit, with body mounted on latter.

On these vehicles the state legislatures impose a wide variety of size and weight restrictions, which must be satisfied if they are to be legally operated. The diversity is brought out by the accompanying charts, showing the range of overall lengths and gross weights of the 4-wheelers and tractor semi-trailers (combinations), arranged by the groups of states adopted by the U. S. Bureau of the Census.

The Census grouping has also been used in the tables included in this article. These show for each state the more important restrictions, several of which may apply to a particular vehicle. If that vehicle is run regularly in two or

more states, it must comply with the most severe limitations of the most severe state. In certain of the groups a high degree of uniformity exists among the states.

The maximum allowable width is 96 in. in all except three of the states, while a height of 12 ft. 6 in. has been adopted by 26 states and the District of Columbia. These dimensions are as recommended by the National Conference on Street and Highway Safety, and by the American Association of State Highway Officials. Their recommendation for maximum length of a single unit (35 ft.) is found in 19 states. The use of the bridge formula to determine gross weights, as proposed by two national bodies, has been legalized in 14 states, mostly west of the Mississippi River. States to the eastward are likely to use other methods of fixing allowable weights.

New England States More Liberal

The 1939 sessions of three New England state legislatures acted to increase gross weight limits and at the same time to bring their requirements more nearly in line with those of the other three states. Maine increased the 4-wheel gross to 30,000 lb.; the limit had been 24,000 lb. for such

units. New Hampshire raised by 2,000 lb. the allowance for the three designs shown in the table. The largest jump was made in Vermont, which permits 3,000 lb. more on the 4-wheelers, and 5,000 lb. more on the 6-wheelers and combinations. These Vermont increases apply only to operation on state highways, lower limits obtaining on state-aid and on other highways.

Connecticut and Rhode Island stand alone as permitting vehicles of 102 in. width. The latter, along with Georgia and Arizona, specify 85 ft. as the allowable length of tractor semi-trailers. Instead of controlling maximum axle or wheel load Connecticut gets much the same effect by requiring that no axle may carry less than 20% of the vehicle gross.

Middle Atlantic Features

Tractor semi-trailers may have a maximum length of 50 ft. in New York, but to protect highway bridges the gross weight allowed for such combinations is proportioned to the distance between the first and third (trailer) axles. The weight is determined by the bridge formula: $750 (L \text{ plus } 40)$, in which L is the distance in feet between the first and third axles. In this case and in

SIZE-WEIGHT RESTRICTIONS

STATE	Size Restrictions					Gross Weight (Legal Limits)	Practical Gross Weight Limits			
	Width, In.	Height (Ft.-In.)	Length				Single Unit	4-Wheel	6-Wheel	4-Wheel, Tract., 2-Wheel, Sm. Tr.
			Single Unit, Ft.	Tract., Semi-Tr., Ft.	Min. Tandem Axle Spcg., In.					
NEW ENGLAND STATES										
Maine	96	12-6	40	40 ¹	NS	600	22 ²	30 ³	40	40
N. H.	96	NR	33	45	NS	800	18	28	40	40
Vt.	96	12-0	50	50	40	600	16 ³	28 ⁴	40 ⁴	40 ⁴
Mass.	96	NR	28 ⁵	40	NS	800	NR	30	40	40
R. I.	102	12-6	NR	85	NS	800	22.4	32	40	40
Conn.	102	12-6	40	40	NS	NS	PC	32	40	40
MIDDLE ATLANTIC STATES										
N. Y.	96	13-0	35	50	46	800	22.4	36	44	61.5 ⁶
N. J.	96	12-6	28 ⁷	45	NS	NS	WL	30	40	60
Pa.	96	12-6	33	45	36	800	18 ⁸	26 ⁹	36 ⁹	39
EAST NORTH CENTRAL STATES										
Ohio	96	12-6	35	40	NS	650 ¹⁰	18	24	24	42
Ind.	96	12-0	35	40	40	800	16	32 ¹¹	39 ¹²	40
Ill.	96	NR	35	35	40	800	16	24	40	40
Mich.	96	12-6	35	50	NS	700 ¹³	18 ¹⁴	36 ¹¹	44 ¹⁵	54 ¹¹
Wisc.	96	12-6	33	45	40	800	19 ¹⁶	24 ¹⁶	36 ¹⁶	43 ¹⁶
WEST NORTH CENTRAL STATES										
Minn.	96	12-6	40	40	NS	NR	18 ¹⁷	36 ¹⁷	42 ¹⁷	54 ¹⁷
Iowa	96	12-0	33	45	40	NR	16	32 ¹¹	33.9 ¹⁸	40.7 ¹⁸
Mo.	96 ¹⁹	12-6 ¹⁹	33 ²⁰	40 ²⁰	NS	600 ¹⁹	16 ¹⁹	24 ¹⁹	24 ¹⁹	38 ¹⁹
N. D.	96	12-6	40	40	NS	600	16	32	35	35
S. D.	96	13-0	30	40	NS	NR	NR	20	24	30
Neb.	96	12-0	35	42	NS	NR	16	32	32	40
Kan.	96	12-6	35	35	40	NR	18 ²¹	28 ²²	34	46.9 ²³
SOUTH ATLANTIC STATES										
Del.	96	12-2	33	60	NS	700	18	26	36 ²⁴	40
Md.	96	NR	NR	NR	NS	700	18 ²⁵	26	36 ²⁶	42
D. C.	96	12-6	33	33	40	880	24.64 ²⁷	30.8	39.6	39.6
Va.	96	12-6	33	45	40	650	16	24 ²⁸	35	35
W. Va.	96	12-6	35	45	40	NR	16 ²⁹	32 ³⁰	48 ³⁰	48 ³⁰
N. C.	96	12-6	35	45	NS	600	18 ³¹	20	40	40
S. C.	96	12-6	35	45	40	NR	18 ³¹	25	25	40 ³²
Ga.	96	12-6	30	85	NS	800	17.6	22	39.6	39.6
Fla.	84	12-0	35	35	NS	550	NR	16 ³³	16 ³³	19
EAST SOUTH CENTRAL STATES										
Ky.	96	11-6	26-6	30	NS	800	NR	18	18	18
Tenn.	96	12-0	27	35	NS	NS	16	24	24	24
Ala.	96	12-0	30	40	NS	NR	NR	20	20	20
Miss.	96	12-6	40	40	40	700	18 ³⁴	22	30	30
WEST SOUTH CENTRAL STATES										
Ark.	96	12-6	35	45	40	NS	15.2 ³⁵	23.2 ³⁵	38.4 ³⁶	38.4 ³⁵
La.	96	12-6	33	45	40	600	18 ³⁷	8PL	14PL	14PL
Okla.	96	12-6	45	45	NS	600	NR	24	24	47
Tex.	96	12-6	35	45	NS	600	NR	7 ³⁸	7 ³⁸	7 ³⁸
MOUNTAIN STATES										
Mont.	96	13-6	33	60	40	600	18	36 ³⁹	45.5 ⁴⁰	54 ⁴¹
Idaho	96	14-0	35	45	NS	800 ⁴²	18	28 ⁴³	42 ⁴⁴	42 ⁴⁵
Wyo.	96	12-6	40	45	NS	800	18	36 ⁴⁶	43.2 ⁴⁷	46.2 ⁴⁸
Colo.	96	12-6	35	40	40	NS	18 ⁴⁹	24	34	50.4 ⁵⁰
N. M.	96	12-6	35	45	40	700	18 ⁵¹	36 ⁵¹	40.2 ⁵²	46.2 ⁵³
Ariz.	96	14-6	33	85	NS	700	18	22	34	40
Utah ⁵⁴	96	14-6	45	60	NS	800 ⁵⁵	18	36 ⁵⁶	53.9 ⁵⁷	54 ⁵⁸
Nev.	96	13-6	60	60	42	600	NR	25	38	38
PACIFIC STATES										
Wash.	96	12-6	35	60	42	500	18 ⁶⁰	24 ⁶¹	34 ⁶¹	42 ⁶¹
Ore.	96	11 ⁶²	35	35	40	600 ⁶³	18 ⁶⁴	36 ⁶⁵	46.9 ⁶⁶	46.9 ⁶⁶
Cal.	96	13-6	33	60	40	NS	17	26	34	43 ⁶⁸

NOTES

- NR—No restriction.
 NS—Not specified.
 PC—No axle may carry less than 20% of vehicle gross.
 WL—Allowable wheel weights specified, varying with type and width of wheel, and with diameter. Maximum wheel load, 21,500 lb. for 13.50 x 24 in. dual low pressure balloon) tires.
 PL—Pay Load.
 1.—Trailers permitted only 26 ft.
 2.—Vehicles with axles less than 10 ft. apart limited to 16,000 lb. per axle.
 3.—No restriction unless vehicle gross exceeds 20,000 lb.
 4.—On state highways only; limit on state-aid highways, 20,000 lb.; on other highways, 16,000 lb.
 5.—Limit 33 ft. for two-axled vehicles on designated ways; and 33 ft. for three-axled vehicles.

- 6.—Computed by formula: Gross weight equals 750 (L plus 40), in which L is distance in feet between first and last axles.
 7.—Limit 35 ft. for three-axled vehicles.
 8.—Limit 8,000 lb. on front and 16,500 on rear axles of 6-wheeled single unit.
 9.—Allowable when weight of 4-wheel chassis is 9,000 lb. and over; or when weight of 6-wheel (three-axle) chassis is 12,000 lb. and over. Gross weights lower for lighter chassis.
 10.—Limit for tires 6 in. and over; 600 lb. for 5 in.; 500 lb. for 4 in.; 450 lb. for 3 to 3½ ins.
 11.—Maximum gross when all axles carry maximum allowable load.
 12.—Computed by formula: Gross weight equals 600 (L plus 40).
 13.—Reduced March 1 to May 31 to 525 lb. (25%) on concrete pavement or pavement with concrete base; or to 450 lb. (35%) on all other types of roads.
 14.—Axle load limited to 13,000 lb. for spacing 3 ft. 6 in. and under 9 ft., while 18,000 lb. limit is maximum for two axles less than 3 ft. 6 in. apart, combined. These values further reduced as indicated in Note 13.
 15.—Subject to allowable axle loads as specified in Notes 13 and 14.
 16.—Permissible on Class A highways; these weights are reduced approximately 37% on Class B highways.
 17.—Limit is 12,000 lb. when axles are spaced under 8 ft. apart.
 18.—Computed by formula: Gross weight equals 450 (L plus 53 1/3).
 19.—More liberal (larger) values permitted in cities of 75,000 or more inhabitants.
 20.—Less liberal (shorter) lengths specified in cities of 75,000 or more inhabitants.
 21.—Permissible on low-pressure tires; limit, 16,000 lb. on high-pressure tires.
 22.—Duals not less than 8 in. wide; limit, 24,000 lb. for narrower tires.
 23.—Computed by formula: Gross weight equals 700 (L plus 40).
 24.—Limit 38,000 lb. for 6-wheeled three-axled truck, with two hubs and brakes on each hub.
 25.—Limit 20,000 lb. for 4-wheeled vehicles drawing semi-trailers.
 26.—Limit 42,000 lb. for 6-wheeled three-axled vehicle with two hubs on each rear axle and power brakes on each rear hub.
 27.—Limit 15,400 lb. when axles are spaced under 12 ft.
 28.—Limit 32,000 lb. for two-axled vehicles with 6 wheels.
 29.—Limit 18,000 lb. on major highways in "industrial areas" and 22,000 lb. on such highways in "metropolitan areas."
 30.—Maximum gross when all axles carry maximum load. Also subject to formula: Gross weight equals 1330-1000-670 (L plus 40), which applies to highways dependent on type of bridges therein.
 31.—Limit 18,000 lb. with power brakes and six tires.
 32.—With 9.75 x 20 dual low-pressure tires; limit less for smaller tires.
 33.—Maximum when all axles carry maximum allowable load; also subject to formula: Gross weight equals 700 (L plus 40) where axle spacing is more than 7 ft., or 650 (L plus 40) when not more than 7 ft.
 34.—Pay load or capacity; but limit 14,000 lb. capacity and 55 ft. length for vehicle or combinations transporting property to or from receiving or loading point of common carrier.
 35.—Computed by formula: Gross weight equals 700 (L plus 40), but when L is 20 ft. or less, gross is determined by 650 (L plus 40).
 36.—Tires over 5 in. Limit 600 lb., for tires 3 to 5 in.; 400 lb. for tires less than 3 in.
 37.—Limit 22,000 lb. when axles spaced under 13 ft.
 38.—When first and third axles are not less than 13 ft. apart.
 39.—Gross weights limited by formula (Note 23) or by three times the unladen weight.
 40.—Limit 14,000 lb. on 3-axle units, or 12,000 lb. in combinations.
 41.—Minimum axle spacing, 8 ft. between first and second axles; also subject to formula; Gross weight equals 750 (L plus 40).
 42.—Up to 12 ft. 6 in. allowed by special permit.
 43.—When total tire width exceeds 30 in.; limit 500 lb. when width is less than 30 in.
 44.—On paved highways; limit 16,000 lb. on unpaved highways.
 45.—Combinations subject to formula: Gross weight equals 1750 (L plus 8).

others in this article where use of the formula is required, an overhang of 8 ft. is subtracted from the maximum length provided, to derive the distance (L) between axles.

Wheel loads varying with the size and type of tire equipment are used in New Jersey, to limit the gross weights specified by law. Unlike Arkansas, the only other state to use this practice, New Jersey lists practically all the commercial sizes of low and high pressures tires, up to 13.50 x 24 dual balloons. Arkansas on the other hand provides that the load given for 9.75 x 20 dual balloons shall be the maximum load allowed on any axle.

Chassis weights are used to determine allowable gross weights in the Commonwealth of Pennsylvania. The 4-wheelers are divided into eight classes, arranged by chassis weights, each class being assigned its own allowable gross weight. At the light end, chassis of less than 2,000 lb. are permitted a gross or 5,000 lb. The

maximum gross on 4-wheelers (26,000 lb.) is permitted only on chassis weighing 9,000 lb. or more.

Besides being the only state to base gross upon chassis weight, Pennsylvania is considered to have the most rigid requirements of the Northeastern states. A vehicle bought as "Legal for operation in Pennsylvania" is likely to pass muster in any of the neighboring states.

Axle Restrictions— East North Central States

Maximum axle load is determinative of gross weight of 4-wheelers in Indiana and Michigan, and in the latter, of 6-wheelers and tractor semi-trailers as well. The gross weights shown in the table are legal rather than practical, because of the fact that the front axle does not carry the maximum allowable axle load. Indiana for example applies a bridge formula which would permit 40,200 lb. gross on a 4-wheeler. But this would be illegal, since the limit

on any axle is 16,000 lb., or 32,000 lb. for a two-axle vehicle. With the weight distribution now obtainable the gross might be around 23,000 lb., assuming 16,000 lb. maximum on the rear, and 7,000 lb. on the front.

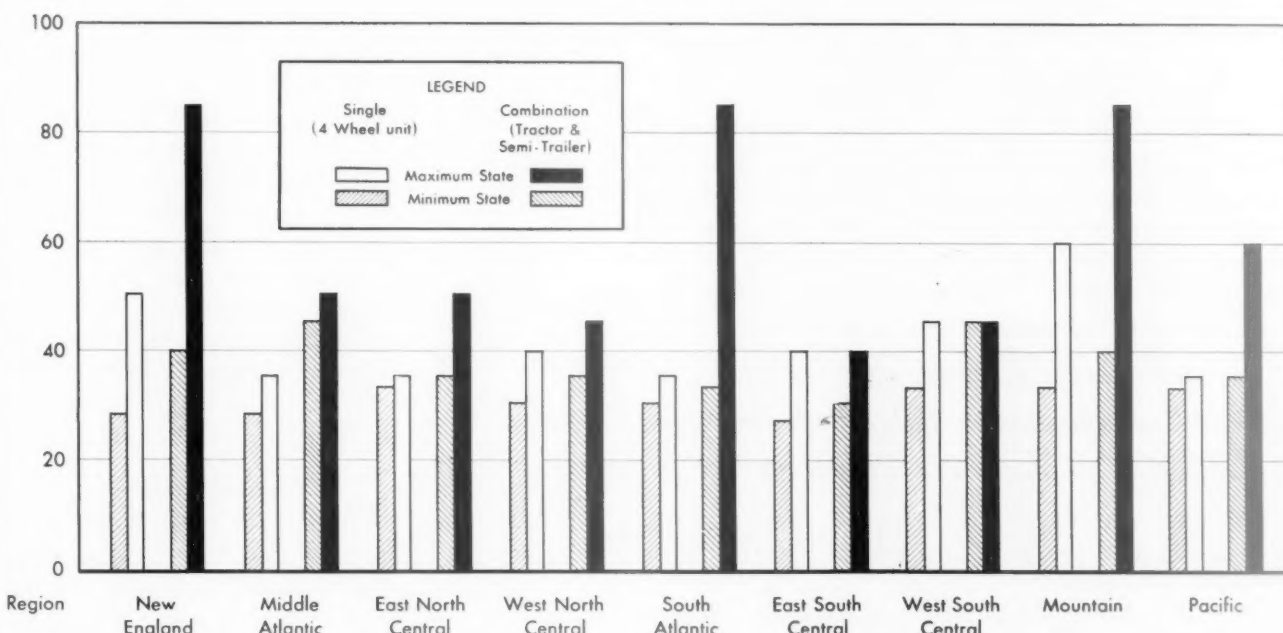
In Michigan the allowable axle load is reduced with the decrease in axle spacing, and the second and third axles of a 6-wheeler, if between 3 ft. 6 in. and 9 ft. apart, would each be permitted only 13,000 lb. load. The legal maximum therefore is 18,000 (front) plus 13,000 (second) plus 13,000 (third) or the total shown of 44,000 lb.

Impractical Limits— West North Central States

North Dakota and Nebraska furnish another example of the effect of axle restrictions. Each of these states actually permits 32,000 lb. gross for 4-wheelers, while limiting the load on any axle to 16,000 lb. For reasons given previously, the practical gross, with present-day vehicles

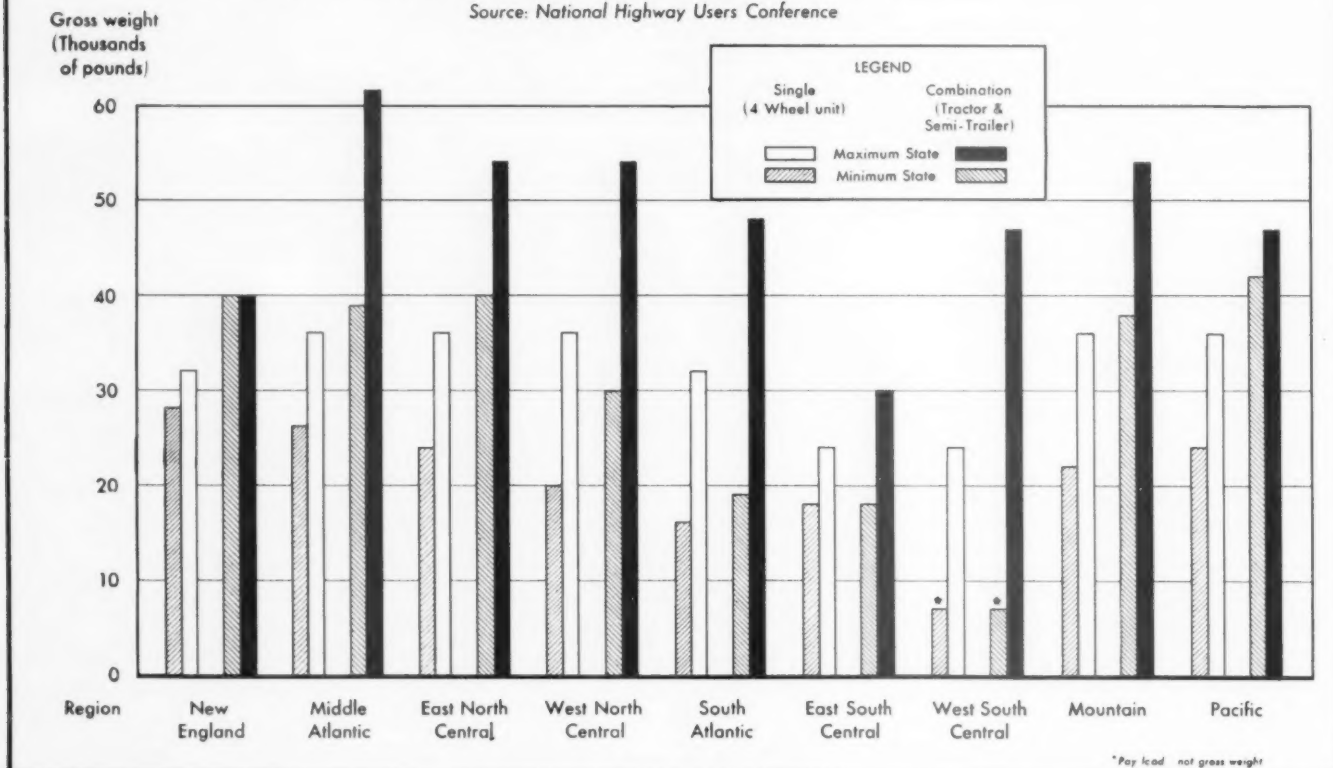
ALLOWABLE OVERALL LENGTH OF VEHICLES OR COMBINATIONS, BY REGIONS

Source: National Highway Users Conference



ALLOWABLE GROSS WEIGHT OF VEHICLES OR COMBINATIONS, BY REGIONS

Source: National Highway Users Conference



and the rear axle loaded to the 16,000-lb. limit, would be well under 25,000 lb. Hence the difference in gross weights permitted in North Dakota and Nebraska, and that allowed in the intervening state of South Dakota (20,000 lb.) would be much less than suggested by the gross weights shown in the table.

Brakes Help In South Atlantic States

When specified brake equipment is used, Delaware, Maryland and Florida permit increased gross weights on 6-wheel vehicles. Florida adds 2,000 lb. to both 4-

wheel and 6-wheel vehicles, when fitted with power brakes and six tires. The same increase of 2,000 on 6-wheelers is permitted by Delaware, while Maryland adds 6,000 lb. for such vehicles, provided in either state the two rear axles have brakes on each hub.

Except for Florida, which holds to 18,000 lb. gross and an 84-in. maximum width, the Middle Atlantic states have tended in recent years toward uniformity and liberalization. South Carolina last year lined up more nearly with its neighbors, particularly as regards allowable length and gross weight of tractor semi-

trailers. Its present 40,000 lb. weight limit for such equipment is double that formerly permitted.

Greater Cross—East South Central States

Two of the East South Central states have made appreciable changes in their gross-weight allowances. Tennessee now permits 24,000 lb. for the various freight vehicles, or 6,000 lb. more than previously. Mississippi last year revised its requirements to permit 30,000 lb. for six-wheelers and tractor semi-trailers, as compared with the former 22,000 lb. for each of these types. Gross weights permitted in Kentucky are lower than in practically all the other states. Lengths of vehicles that may be used there are less than in any other state.

Capacity Limits—West South Central States

Net or pay load, rather than gross weight, determine the legality of operation in Louisiana
Continued on page 80

No. 3 in a series of articles on the basic features and recent developments in design and operation, essential to efficient procurement of automotive equipment.

Next Month:

**Laws Affecting
Vehicle Equipment**

What's Wrong With GOVERNMENT PURCHASING?



¶ Much orthodox government purchasing is inefficient that need not be.

¶ The procedure which can properly be used in some classes of requirements has been forced on to the procurement of other classes of requirements where it does not apply and where it often makes governmental buying look ridiculous.

¶ Someone, sometime, put an all-inclusive strait-jacket on governmental purchasing which, it seems, no one has had the intestinal fortitude to question.

OF course, not all government purchasing is subject to these criticisms. Many governmental units and many states, cities and institutions and some counties are doing as good a job of procurement as industry is doing. However, if they are following the formula laid down by some branches of the Federal government, the good record is in spite of the formula and not because of it.

Some of the particular policies and practices in government purchasing which I indict are:

1. On all purchases three bids must be received. On all items over a certain amount, bids must be advertised.
2. The bids of all bidders who can produce a bid bond or a certified check for 10% of the bid amount must be given equal consideration.
3. The lowest bid on any offering that can qualify under the specifications is the best buy.
4. After having set up adequate detailed specifications, there is little need for the exercise of individual discretion in the taking of bids and awarding of orders other than checking the surety and qualifying the offerings.

DIRECTOR'S ORDER NO. 73

Under and by virtue of the authority vested in me by Executive Order No. 6166 of June 10, 1933, and in order to reduce government expenditures, increase the efficiency of government operations, and eliminate overlapping and duplication of effort, I hereby prescribe the following regulations:

1. As used herein—

(a) The term "agency" means any commission, independent establishment, board, bureau, division, service, or office in the executive branch of the Government, except the War and Navy Departments and the Marine Corps.

(b) The term "supplies" means all tangible personal property including, but not limited to, materials, supplies, articles, facilities, improvements, machinery, equipment, and stores.

(c) The words "procurement of supplies" and "procurement" include all functions relating to or associated with the purchase, rental, warehousing, distribution, and transportation of supplies, and services incidental thereto.

2. The Procurement Division, Treasury Department, shall hereafter undertake the performance of procurement of all supplies for use either at the seat of government or in the field for all existing government agencies and such agencies hereafter created: Provided, that any agency may perform such procurement itself to the extent permitted by the Director of Procurement, until such date as the Director may designate with respect to specific agencies, specific kinds of procurement or specific supplies.

3. The offices of the Procurement Division now existing in the several states shall form the nucleus for the field activities of a general procurement service.

4. All records and property pertaining to, or utilized in, the procurement of supplies by any agency, and all personnel engaged in the procurement of supplies for any agency,

are hereby transferred to the Procurement Division, such transfer to be effective upon such date as the Director of Procurement may prescribe with respect to specific agencies, specific kinds of procurement, or specific supplies. Such part of the unexpended balances of appropriations or funds, available to any agency for personal services and other expenses, in connection with the procurement of supplies which the Secretary of the Treasury, with the approval of the Director of the Bureau of the Budget, shall transfer to the Procurement Division pursuant to Treasury Department Appropriation Act of 1940 (Pub. 65 - 76th Congress, First Session) and any other law authorizing such transfer, shall be available for the use of the Procurement Division in performing the functions of procurement undertaken pursuant to this order.

5. The Director of Procurement may, with the approval of the Secretary of the Treasury, issue such regulations and instructions as may be necessary to make the provisions of this order effective.

6. The provisions of this order shall not apply to the War and Navy Departments and the Marine Corps.

7. The regulations governing the operation of the Branch of Supply, Procurement Division, approved by the President April 12, 1935, are hereby superseded to the extent that they are inconsistent with the provisions of this order.

W. L. C. [Signature]
Director of Procurement
June 1, 1939

APPROVED:

[Signature]
Secretary of the Treasury
June 1, 1939

APPROVED:

[Signature]
The White House
June 1, 1939

5. Government buyers must be curbed by legal restrictions or their buying will be too largely dictated by their avarice or their prejudices.

I believe the foregoing are fair statements of some of the precepts of governmental purchasing, at least as followed by most branches of the Federal government. In some classes of governmental buying, such regulations are not out of place and I would not abolish them if I could in the procurement of the classes of requirements to which they

apply. However, there is a tremendous volume of consumers' goods, equipment, appliances, furnishings and supplies being bought by government institutions and agencies, for the procurement of which such regulations are a *hindrance*. Maybe this is heresy, but I believe it is high time that the following of those requirements in such cases is recognized as unscientific, inefficient and unwarranted.

As you review the five precepts enumerated above, is there even one that is generally followed in

Purchasing for Federal Government departments and bureaus—in Washington alone—is now being carried on in 100 separate offices, as shown on the chart insert. Under the reorganization plan of 1939, it is proposed to remedy this by centralizing authority for purchases. The executive order is reproduced above. Industrial buyers will watch the progress of this program with keen interest.

PURCHASING OFFICES OF GOVERNMENT WASHINGTON, D. C.

EXECUTIVE DEPARTMENTS	PURCHASING OFFICER	LOCATION	EXECUTIVE DEPARTMENTS	PURCHASING OFFICER	LOCATION
THE WHITE HOUSE	Frank K. Sanderson Administrative Officer	White House	U. S. Marine Corps.	The Quartermaster	Room 32 Bldg.
State Department	Clinton E. MacEachran Chief Clerk and Admin. Asst.	Room 102, State, War & Navy Bldg.	Department of the Interior	W. B. Fry Purchasing Officer	Room 266
	Herbert C. Hengstler Chief, Foreign Svc. Admin.	Room 115, State, War & Navy Bldg.	St. Elizabeth's Hosp.	Miss C. M. Gaston Purchasing Agent	Nichols A. costia
	Maitland S. Wright Chief of Supplies Section	Room 68, State, War & Navy Bldg.	Freedmen's Hospital	Dr. T. Edward Jones Surgeon in Chief	6th & Br
	Robert J. Phillips Acting Chief of Foreign Bldgs. Office	Room 330½, State, War & Navy Bldg.	Howard University	L. L. Whaley Purchasing Agent	2401 6th
Treasury Department			Nat'l. Park Service	S. J. Oliver Chief, Supply Section, Branch of Bldgs. Mgt.	Room 550
Bureau of the Mint	Miss Mary O'Reilly Assistant Director	Room 182, Treasury Bldg.	Department of Agriculture	Alex McC. Ashley Chief, Div. of Purchase, Sales and Traffic	Room 344 Bldg.
Bureau of Engraving and Printing	C. R. Klose Purchasing Officer	Room 158, Bureau of Engraving		James M. Locknane Associate Chief, Div. of Purchase, Sales & Traffic	Room 344 Bldg.
Coast Guard	Comdr. W. J. Keester Chief, Supply Officer	Room 601, 1512 H Street N. W.		S. A. Snyder In Charge Central Supply Section	Room 190 Bldg.
War Department	Frank B. Bourn Chief, Supplies and Accts. Div.	Room 1241, Munitions Bldg.	Weather Bureau	D. Y. Engell	24th & N
Wash. Qtrmstr. Depot Procurement Division	Purchasing & Contracting Officer	24th & M Sts., N. W.	Bureau of Animal Industry	F. L. Hoffman	Room 41 East W
Army Medical Center (Walter Reed)	Qtrmstr., Army Med. Center	Georgia Ave. & Butternut St.	Bureau of Plant Industry	George B. Holmes In Charge	Room 2 West V
Bolling Field	Quartermaster	Ft. of Portland St., S.E. Anacostia, D. C.	Forest Service	M. R. Kennedy Procurement Officer	1st and Independ
Fort Humphrey (Army War College)	Quartermaster	2nd Floor, Bldg. 26-A P St. bet. 3rd & 4th, S.W.		J. B. Holden Asst. Procurement Officer	1st and Independ
Department of Justice	John F. Holland Chief, Supply Division	Room 1246, Dept. of Justice Bldg.	Food & Drug Admin.	R. E. Conner	Room 117 Bldg.
	H. C. Donaldson Chief Clerk	Room 1605, Dept. of Justice Bldg.	Bureau of Chemistry and Soils	J. W. Stevens	Room 411 Bldg.
Federal Prisons Industries, Inc.	R. H. Armstrong Admin. Assistant in Charge Contracts and Purchases	Room 4744, Dept. of Justice Bldg.	Bureau of Entomology and Plant Quarantine	S. B. Walker	Room 583 Bldg.
	R. E. Ramsey Contract Clerk	Room 4744, Dept. of Justice Bldg.	Bureau of Biological Survey	J. L. Talbert	Room 491 Bldg.
Post Office Department	Harrison Parkman Purchasing Agt. & Director of Bldg. Operations & Supplies	Room 3332, New Post Office Dept. Bldg.	Library	R. T. Umhau Purchasing Officer	Room 140 Bldg.
	Alfred H. Keim Asst. Purchasing Agent	Room 3334, New Post Office Dept. Bldg.	Bureau of Public Roads	Maj. Otto Engelmann	515 14th
Department of the Navy	P. J. Plant Chief, Supply & Division of Secretary's Office	Room 1542, New Navy Bldg.	Bureau of Agricultural Engineering	George P. Wolf Administrative Officer	Room 125 Bldg.
Bureau of Supplies and Accounts	Capt. B. B. Wainwright, Jr. In Charge, Purchase Division	Room 1105, New Navy Bldg.	Bureau of Agricultural Economics	D. N. Hevener	Room 304 Bldg.
			Bureau of Dairy Industry	J. M. Kemper Assistant Chief	Room 295 Bldg.
			Soil Conservation Svc.	Shane MacCarthy, Head Procurement, Contracts & Space Section	Room 433 Bldg., P St., N. W.

SEPTEMBER 1939

VERNMENTAL DEPARTMENTS ON, D.C.

NG 2	LOCATION	EXECUTIVE DEPARTMENTS	PURCHASING OFFICER	LOCATION
er	Room 3205, New Navy Bldg.	Agricultural Adjustment Administration	F. E. Hodge, Acting in Charge Property & Supplies	Room 1971, Agricul, South Bldg.
icer	Room 2661, Interior Bldg.	Department of Commerce	Walter S. Erwin Chief, Div. of Pur. & Sales	Room B-518, Commerce Building
in ent	Nichols Ave. Beyond Anacostia			
nes ef	6th & Bryant Sts., N.W.	Bureau of Standards	G. H. Vaneman	Conn. Ave. & Upshur St.
	2401 6th St., N.W.	Bureau of Census	Arthur J. Hirsch Chief Clerk	Room 5816, Commerce Bldg.
ent		Department of Labor	S. J. Compers Chief Clerk	Room 3113, Dept. of Labor Bldg.
Section, s. Mgt.	Room 5508, Interior Bldg.			
Purchase, ic	Room 344, Agricul. Admin. Bldg.	Immigration and Naturalization Service	B. R. Sherwood Chief, Div. of Publications and Supplies	Room 1410, Dept. of Labor Bldg.
ne f. Div. of &	Room 344, Agricul. Admin. Bldg.		W. H. Wagner Admin. Ofcr. of Bureau	Room 4418, Dept. of Labor Bldg.
EMERGENCY AGENCIES				
tral Sup-	Room 1905, Agricul. South Bldg.	Fed. Emergency Administration of Public Works	W. B. Fry Purchasing Officer	Room 2661, Interior Bldg.
	24th & M Sts., N.W.	Work Progress Administration	Harry L. Kinnear Chief Clerk	Room 116, 1734 N.Y. Ave., N.W.
	Room 419, Agriculture East Wing	Fed. Surplus Commodities Corporation	Wm. T. Wolfrey Office Manager	Room 2026, Temp. Bldg 2, 1901 D St., N.W.
	Room 23, Agriculture West Wing	Emergency Conservation Work	Miss Addie Hughes Chief Clerk, Ofc. of Director	Room 2442, New Post Office Bldg.
fficer	1st and 2nd Floors, 908 Independence Ave.	Rural Electrification Administration	O. K. Inderlied Chief Clerk	1518 K St., N.W.
ent	1st and 2nd Floors, 908 Independence Ave.	Resettlement Administration	T. J. McAdams Chief, Purchase Sec.	3rd. Floor, City Club, 1320 G St.
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	Room 4112, Agricul. South Bldg.			
	Room 5838, Agricul. South Bldg.	U. S. Employees' Compensation Commission	R. L. Woodward Asst. Chief, Accts. & Maint. Div.	Room 126, Old Patent Office Bldg.
	Room 4911, Agricul. South Bldg.		Wm. McCauley Secretary	
cer	Room 1409, Agricul. South Bldg.	General Accounting Office		Room 156, Old Land Off. Bldg.
ann	515 14th St., N.W.	R. F. Martin Chief Clerk		
Officer	Room 1252, Agricul. South Bldg.	Interstate Commerce Commission	W. F. Wilkinson Chief of Supply Section	Room 137, Old Pension Office Bldg.
	Room 3048, Agricul. South Bldg.		A. H. Laird, Jr. Purchasing Agent	Room 1134, Inter. Commerce Comm. Bldg.
	Room 2953, Agricul. South Bldg.		William L. Collins Asst. Purchasing Agent	Room 1136, Inter. Commerce Comm. Bldg.
Head ontracts i	Room 439, Standard Oil Bldg., Penn Ave. at 3rd St., N.W.		Board of Governors of the Federal Reserve System	J. Edward Kilgore Administrative Asst.

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	Charles A. Lewis Asst. Purchasing Clerk	Room 2315, Internal Revenue Bldg.	Securities and Exchange Commission H. P. CH
Federal Power Commission	Earl F. Sechrest Administrative Asst.	Room 412, Hurley-Wright Bldg., 1003 K St.	Federal Communications Commission John As
Federal Housing Admin.	Miss Elizabeth Presley Pur. & Prop. Officer	Room 100, FHA Bldg., Vermont Ave. & K Sts. N.W.	N. F. CH pli
Veterans' Administration	R. C. Kidd Chief, Procurement Div.	Room 736-A, Arlington Building, Vermont bet H & I, N.W.	National Archives Colla Ex
National Mediation Board	M. D. Lewis Assistant Secretary	Room 1734, Dept. of Justice Bldg.	Frank Chief Sur
The Panama Canal	Chief of Office and General Pur. Officer	5th Floor, 1435 K St., N.W.	Register of Wills and Clk of the Probate Court Miss CH &
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International Joint Comm.	Miss Minnie Mahler Chief Clerk	Room 1706, Dept. of Justice Bldg.	District of Columbia Mari PU
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American Battle Monuments Commission	James E. Mangum Executive Assistant	Room 1412, New Post Office Bldg.	J. T. De
Smithsonian Institution	James H. Hill Property Clk. & Supt. of Buildings	Room 133, Smithsonian Building.	Geo. As
National Museum	W. A. Knowles Property Clerk	Room 85, Natural History Bldg.	Library of Congress Robe CH
National Zoo. Park	D. L. Dupre Purchasing Agent	Zoo., Adams Mill Rd. Gate	W. C. Su
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	J. M. Ofenstein Asst. Chief Clerk	Room 120, 1825 H St., N.W.	John A
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Home Owners' Loan Corp.	Pur. & Sup. Section		
Fed. Sav. & Loan Ins. Corp.			
Savings and Loan Div.			
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DEPARTMENT	PURCHASING OFFICER	LOCATION
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	R. L. Crim Asst. Purchasing Officer	Room 138, 1300 E. St. N.W.
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	Frank P. Wilson Chief, Div. of Purchase & Supply	Room 107, National Ar- chives Bldg.
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Records	Miss Catherine F. Downing Chief Clerk	Room 4, 412 5th St., N.W.
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	David Lynn Acting Director	Capitol Building, Md. Ave. bet. 2nd & 3rd, S.W.
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Commission	C. W. Powell Supply Officer	821, 15th St., N.W.

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PURCHASING
205 East 42nd St.
New York, N. Y.

industrial buying for the purchasing of casual supplies, equipment and furnishings? I think not. And yet they are available for industry to use if and when industry finds them indispensable to good purchasing.

How does an industrial procurement officer in actual practice proceed to buy a requirement of, say 10 office desks for his firm? He selects from among the logical suppliers all of those known from his experience or by their reputations to be likely to have the grade of merchandise indicated for his particular need. He makes his requirement known to them in a manner conducive of a real "meeting of minds" perhaps by indicating a manufacturer's catalog number on a desk which he has found to be satisfactory.

The several firms invited to submit proposals presumably offer one or two of their numbers nearest in specification to the one the buyer has indicated. They bring out in sales interviews, in pictures, and by displaying their wares, the best appeal of their offering. They listen to the buyer's comments which indicate his reaction based on his knowledge of his needs. They quote him their price and terms. The buyer accepts the proposal which represents *the best value for his particular purpose*.

Presumably he tells the losers the reasons for his choice. The unsuccessful bidders charge it up to experience and hope for better luck on the next prospect.

But how about the unsuccessful bidders on a government deal? The losing bidders, whose bids were high, squawk that the desks that were bought are cheap junk, and the losing bidders whose bids were lower but whose desks were thrown out as not equalling the specifications, squawk that they were given the run-around. Both losing groups are endowed with special rights in the deal as taxpayers, so both squawk their protests to the "man higher up". If the government buyer swallows

his judgment and accepts the low bid without attempting to disqualify some desks which bidders insist are "just as good", he will, in nine cases out of ten, get an inferior desk. If he makes his specifications restrictive and sticks to his guns, he may eliminate all competition and again the outsiders among the dealers feel they have a squawk coming.

to bid to only three firms. While the regulation was not intended to limit the bidding to three bids, the temptation (since the law tends to make the buying agent a clerk rather than a purchasing agent anyway) is to comply with the letter of the requirement and to slight the real purpose.

I have no particular quarrel with the practice of advertising

Private Buyers Find It Difficult to Purchase under Governmental Rules and Hesitate to Play the Role of Critic

"Since most of the complaint arises from my experience with trying to buy under PWA regulations and since our PWA program is not yet finished, I would not want my name published with the article . . . because I would not want my institution to be penalized in any way by reason of my expression of views."

—THE AUTHOR

Wherein lies the difference? Let me point out two significant variances. First, the industrial buying procedure recognizes that there may be more than one desk that will fill the requirement, especially if the difference in price is comparable to the difference in quality. Second, the bidders have no rights in the transaction that would nullify the right of the buyer to choose that desk which his best judgment tells him is the best value for him.

Now let us look at those five precepts one by one.

1. Three bids must be taken on all purchases. In the class of items we are concerned with here, a policy of "three bids" to be logical, should only be a very loose generalization. There are many instances where three honest bids cannot be had, and many where three are not enough. Either there must be a letting down of the specification and an admitting of equipment that is not entirely acceptable or else the use of a subterfuge called the "courtesy bid". On the other hand, the regulation tends to limit the sending of the request

for bids in the newspaper except that it is not effective in getting the bids that are wanted. In most instances, the attention of prospective bidders must be specifically called in some other way. The cost of the ad and the time required are wasted.

2. Equal consideration must be given to any and all bids if proper surety is furnished. An industrial purchaser would consider this ridiculous. In this class of goods, airtight specifications are largely an illusion. The all important matter is the interpretation of the specifications. Some firms that insist on bidding are known not to be able to furnish the goods as specified. Other firms are known to live by their wits more than by their service.

The big fly in the ointment is that there has grown up in this Democracy a great consciousness of one's rights as a taxpayer. Too little has been said about the obligations that go along with those rights. Too often have the rights of the great body of taxpayers, expressed through the governmental agency that is procuring goods, been lost sight of in

the clamor of one or two taxpaying vendors who as unsuccessful bidders yell for their right to shove their goods down the throat of some governmental agency. These goods may be equal to or better than the goods chosen, in the estimation of the bidder, but to be properly bought, it must be the buyer who decides and he must make his choice free of all external pressure.

A surety bond is a broken reed as far as protecting the buyer is concerned. It is no stronger than the contract itself or the weakest construction that can be legally put upon the terms of the contract. Judgment in a court case over difference of interpretation can be as easily collected from a solvent firm without a bond. On small contracts, surety is more often a nuisance than a help.

3. The lowest bid is the best buy. The proponents of the current policy with respect to always taking the low bid, say that all you have to do is to be sure your specifications are adequate, qualify the offerings against the specifications and watch the surety. I maintain that such is a fallacious theory. Two important considerations are working directly contrariwise. The buyer *may* succeed in his attempt to obtain goods that are up to the standard he has set but that is the best he can hope for. If another item, a great deal better, is offered at a little more cost, he is powerless to choose it. On the other hand, if an article a little below the specification is priced at a very great saving well worth the taking, the government buyer must pass it up or throw out all bids and start again. If he throws out all bids and issues new specifications based on the *better* article, the chances are great that he will not get the legally required competition.

A procedure which would permit the buyer to choose the *best value* from among those offered, all things considered, for the purpose intended, ought not to be an

unreasonable demand—and yet that is often impossible under the present procedure. To accomplish that would mean that a government purchasing agent would be allowed discretionary powers and would be required to have enough judgment, experience and honesty to be entrusted with those powers. As it is in Federal government purchasing, what discretion there is, is largely vested in the engineer or the architect or the officer who draws up the specification. After he has drawn up those specifications and turned them over to the procurement officer, he is usually through with the transaction.

Where all bids are apt to be the same, as in the case of several materials and types of equipment, the Federal regulation goes one step further toward the ridiculous and requires acceptance of the bid on which the goods will be shipped the greatest distance. The theory is that more of the delivered cost of the item will be spent by the vendor for transportation, hence the goods themselves will actually cost less. Nice logic, but what a travesty on scientific purchasing! All claims of choice for one make which will do the better job or another make on which service is more readily available, must be ignored.

4. It is possible to write adequate specifications for practically any requirement. I hope that a true believer in this dogma will draw up a set of specifications for me some day for a complete outfit of lounge furnishings of the Renaissance period, that will both admit of adequate competition and when bought on the basis of the low bid will satisfy a competent interior decorator! The thought will serve to illustrate my point. The same type of difficulty applies, to a greater or less degree, to the writing of specifications for many other items of equipment, furnishings and supplies bought for various agencies of an institutions of the government.

It would probably surprise some government buyers who believe religiously in detailed specifications to be shown how many loopholes there are in their specifications, loopholes that are not often taken advantage of by vendors. Vendors usually hope to meet the buyer's requirement, if they can find out what is really desired.

There is a popular misconception about the use of standard specifications. A standard specification may be detailed, and in the case of many requirements it should be carefully detailed. However, the class of requirements I am speaking of here is not for the most part easily amenable to a completely detailed description. It would be preferable to mention a catalog number or brand name with the "or equal" clause and then if necessary proceed to enumerate the details essential to the specific requirement which will not be waived in qualifying alternate offerings. Above all, I should reserve strictly to the buyer, or to the user, the right to determine what alternate offerings are acceptable. I would have it clearly understood that just because a vendor considered his number equal to the one specified, or just because "the trade" classified certain products in one group, does not in any way obligate any governmental buyer to abridge his choice for the specific purpose he has. That will still be within the definition of standard specification and should help both the buyer and the bidder.

5. Government buying must be hedged about with restrictions to prevent graft, favoritism and prejudice. Perhaps so, but my feeling is that both the amount of malfeasance and the need for protection are exaggerated. I doubt if it is much more necessary to assume that a public buyer is likely to be crooked than that an industrial buyer will go wrong. If a real civil service qualification

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SILHOUETTE STUDIES

Benedict Van Voorhis

IN the early part of 1915, a thoroughly disillusioned young mining engineer packed his bags and turned his back on Old Mexico, which for nearly a score of years, man and boy, he had called his home. He was only twenty-six, but he had seen enough. He was fed up with engineering, with Mexican revolutions and Mexican dollars, with trying to plan a life under conditions where some one else could blast your plans overnight—and generally did.

He had resolved to make a fresh start. Just about the most pleasant chapter in his memory was the four-year period he had spent at the Hotchkiss School in Lakeville, Connecticut, and at Yale. So he wrote to a dozen of his closest friends of those days, declaring his intention. One of the replies, from a former roommate, suggested that he should come up to Greenfield, Massachusetts, for a visit until he got his bearings. That invitation was eagerly accepted.

They talked over the prospects of a new connection, and the roommate's father mentioned a new enterprise over in Leominster that had experienced rather phenomenal growth and seemed to offer an opportunity and a future for the right man. The ex-engineer looked into it—found a busy plant, rich in possibilities but very loosely organized and obviously suffering from growing pains. He asked for a job. His former experience didn't mean anything to them, but they put him to work in the shipping room, possibly in the expectation that he would soon become dissatisfied and quit. It didn't work that way, however. He made a place for himself, grew with the growing industry, stayed

with the company through several changes of organization, right up to the present time.

The "new enterprise" of 1915 was the Viscoloid Company, then turning from the manufacture of horn combs to experiment in the little known field of celluloid plastics. It is now the Plastics Division of E. I. duPont de Nemours and Company. And Benedict Van Voorhis is Division Purchasing Agent at Arlington, N. J.

VAN'S forebears came to this country from Holland in 1678 and settled in the Hudson Valley, near Poughkeepsie, where a good many of his relatives still live. His father, an engineer with the Union Iron Works, moved to New York City, where Van was born, April 5th, 1888, the youngest in a family of four. When he was seven years old, the home was broken up by the death of his mother, and the family forsook the brownstone front, moving to Monterey, Mexico, where his father soon built up a flourishing business in mining machinery.

Here the youngster grew up, speaking Spanish as fluently as his native tongue, spending his summers in the saddle and his winters at the West Texas Military Academy and San Antonio Academy. It was accepted as a matter of course that he should go north for his further education. There were three happy years at Hotchkiss, followed by a summer of travel in Europe, and he entered the Sheffield Scientific School at Yale with the class of 1910, headed for a mining engineer's degree.

But during that first year at New Haven, the family fortunes changed abruptly. A series of

disastrous investments in mining stocks wiped out everything, and the lad was faced with the urgent necessity of dropping his studies and finding a job.

With his particular background, Mexico offered the most immediate and lucrative opportunity for a young American with some training but a lack of actual field experience. He had little difficulty in signing up as an assayer for a small lead and silver mine near Monterey, and this was followed by other and more responsible mining jobs. "Gold is where you find it," and the work took him to Cabrillas, south to Ajiuchitlan and west to Durango, sometimes involving a day and a half journey on horseback between operations, rolling up in a blanket and sleeping under the stars in preference to the very dubious native accommodations, far from the single main line of the railroad.

This was under the peaceful regime of Porfirio Diaz. The life was hard and primitive, but healthy and more than tolerable. Then in 1912 came the Madero revolution, ushering in a long period of political upheaval, and conditions rapidly changed for the worse. Van was right in the thick of a couple of engagements—spectacular cavalry charges with plenty of shooting and shouting but few casualties. An American was comparatively safe so long as he hoisted his flag and observed strict neutrality, but property and industry were another matter. The country was infested with guerilla bands that lived off the land and were given to looting and peculiarly offensive methods of reprisals. The shipments of ore, hauled by ox-cart over impossible roads, a week from mine to smelter, were easy

prey for the bandits, and it was practically impossible to keep a horse or other livestock. Naturally, the mining operations were soon abandoned, and employment disappeared. Furthermore, each new revolution set up its own new currency, and blandly announced that previous issues were no longer acceptable. A dollar today was a dime tomorrow. Conditions in general were far from satisfactory.

For a while, Van made the best of a bad situation. He landed a contract to drive a two-kilometer drainage tunnel under a silver mine as a private engineering venture, but ventilation problems defeated him after the project was more than half completed, entailing another heavy loss. Then he became master mechanic for a large farm and irrigation operation near Monterey, conducted by Canadian interests in connection with the sewage disposal phase of a general utility service franchise. It was a favorable opportunity; best of all, it stipulated a salary paid in American dollars. But after a few months, that too was ended by the outbreak of the World War—remote so far as Mexico itself was concerned, but rather intimately affecting his Canadian employers, who found it necessary to stop gold payments. It was at this point that Van concluded he had made a bad start, and that engineering in Mexico was no longer worth while.

HIS start at the Viscoloid Company, in the humble capacity of shipping clerk, was strictly at the bottom of the ladder, and looked none too promising. But the overgrown and very loosely organized character of the company at that time, particularly noticeable in its exceedingly sketchy management controls, provided the opportunity to make several distinct contributions at the very outset. They were perhaps rather simple and obvious to a systematic mind, but the fact remains that no one else had thought of putting them

into effect, and the shipping room proved to be a strategic point for initiating these plans that helped to bring order out of confusion.

For example, he found that he was being constantly interrupted by telephone calls from the sales manager to check up on the stock and see whether certain items were on hand for shipment. With upwards of a thousand numbers in the line, no one apparently had any very definite idea of the inventory situation, with the result that service, balance, and planning were practically non-existent. Van compiled a finished stock list in duplicate, posted one copy up to date every afternoon with the receipts and withdrawals of the day, and had it on the sales manager's desk in the morning, taking back the other copy for his own use and further posting.

The "front office" appreciated that service, and the consequent freedom from needless interruption gave Van time to work out another innovation. As new items were added—and this was practically a weekly occurrence—an identifying number had been arbitrarily assigned. It was a start in the right direction, but cumbersome for reference purposes and very limited in its usefulness. He therefore devised a numerical code in which each digit had some significance and reason, and the resulting numbers showed at a glance the descriptive classification of the item, whether opaque, transparent or translucent, the general color group in which it belonged, and the designation of the individual product.

It was shortly after this scheme had proved its practical value that he was called into the office and given the job of scheduling production. Up to that time, the superintendent had decided each morning what he was going to make that day; not always with the adequate information of requirements to guide his judgment. Van's intimate knowledge of the stock and of the items in greatest current demand, now coordinated with a daily analysis of

sales orders, again brought system and efficiency out of disorganization.

Production planning naturally brought him into contact with the procurement of materials, which was on a haphazard basis, without any centralization of authority and control. Raw materials were bought by the treasurer of the company; the chief accountant, as a purely incidental part of his job, bought the major factory supplies; and the foremen had practically a free hand in sending over to the local hardware merchant for their miscellaneous requirements. Almost anyone could O.K. an invoice for payment under these circumstances, and the accurate allocation of costs was virtually impossible. Van itched to get that situation straightened out. But before he was able to get very far on that project, the war caught up with him again.

HE was among the first to volunteer his services, and did his best to get into the artillery. However, before a protracted and one-sided correspondence to this end had made any noticeable progress toward gaining an appointment in the service branch of his choice, his name was drawn for the National Army and he was instructed to await his call.

Meanwhile he had become engaged to a most attractive Leominster girl, Miss Dorothy Jane Whittier, a graduate of Simmons College, and it seemed like a very opportune time to get married. The wedding took place in July, 1917. Two months later Van was assigned as a top sergeant in the 32nd Company of the 151st Depot Brigade of Infantry at nearby Camp Devens, and put in the coldest winter of his life in training. This was followed by an appointment to the Officers Training Camp at Jacksonville, Florida, where he spent the hottest of summers and emerged as a Second Lieutenant in the Quartermaster Corps.

While this was a far cry from his original ambition to become an artilleryman, he visioned the opportunity to get some practical experience in procurement work, which had so recently claimed his interest in industry, and he welcomed the chance. But his plans were again side-tracked when, with the unpredictable perversity of the military mind, he drew an assignment as Transport Quartermaster on the *S. S. Orca*, a British vessel that had been leased by the United States as a troopship.

With far less authority than he had enjoyed as a top-sergeant, he was turned loose as the sole and responsible representative of the Quartermaster Corps on this sizable boat, to serve as a sort of liaison agent for the government, between the British officers and crew of the vessel on the one hand, and the American officers and men whom they were carrying overseas. It was his duty, for example, to see that the troops observed the strict and special discipline prescribed at sea, and in this he had the fullest cooperation of their officers and enforcement. It was also his duty to contact the ship's officers to see that food and other arrangements were kept up to standard. Always a poor sailor, his personal interest in food was of the most perfunctory nature, but he went through with it as best he could, and presumably with satisfactory results though there is no documentary evidence on this point, for he had no contact with his direct superiors in the Quartermaster Corps to whom he would presumably report. It seemed, in fact, that his assignment would prove to be one of those things that just run on and on, without pride of position or hope of promotion or relief.

The *Orca* made several trips in the transport service, steaming eastward under heavy convoy and loaded to capacity, and running for it all alone on the return voyage. She was a most peculiar appearing ship even to

the unpractised eye of a land-lubber. In the stress of wartime emergency, she had been taken off the ways before she was actually finished, and went through the war with her two top decks missing. As a part of her camouflage, the stack had been deliberately placed off-center, so that she seemed to be perpetually sailing on the oblique, steering a cock-eyed course that pretty well epitomized the young Transport Quartermaster's idea of his own military career.

When they dropped anchor in Liverpool after one of the voyages, the owners announced that the United States lease had expired and that they did not propose to renew, as the *Orca* was required for British transport service to the Mediterranean. Van was left stranded, high and dry, three thousand miles from his base. He was in Liverpool for about a month. Of course he might have reported to Camp Knotty Ash, where he would doubtless have been put to work. But just about that time came news of the Armistice, and his thoughts were chiefly concerned with getting back home to his bride and to the business career which had already been too much interrupted.

At length, in response to his cabled requests for instructions, he was assigned as Transport Quartermaster on the Dutch liner *Rotterdam*, which had been interned during the war and was now being pressed into service for bringing back our troops.

He joined the ship at Hull, where she had gone for fueling, and sailed with her to Brest, where the troops were to embark. There he met another young Quartermaster Lieutenant who had orders duplicating his own. They decided not to make an issue of the matter, but rather to go ahead and share the duty. On that return trip, Van did an intensive job of selling. His new colleague had been buying beef in Spain, and the procurement job had begun to pall. He was

young, footlose, and receptive to the idea of a few more months of service at sea, especially since the *Rotterdam* was luxurious beyond any accommodations that either of them had experienced in military life. Van lost no opportunity to paint the picture in its rosiest hues. When they reached New York, they reported at headquarters to adjust the duplication of their assignments. Uncle Sam was quite willing to accept Van's proffered resignation in view of the fact that an experienced successor was ready to step into the place and carry on. It was a highly successful "sale" from every angle, for all three parties to the transaction were eminently happy about the arrangement.

VAN'S old job at Viscoloid had naturally been filled during his absence, but his record as a former employee who had been useful to the organization won him a sympathetic hearing. There had been little progress in the manner of handling the buying, and it was on this line that he made his application. He was re-hired, with the title of purchasing agent. Though there have been other incidental duties along the way—production planning, safety work, fire prevention, personnel, and service management—from that day on he has never relinquished his personal connection with the purchasing function in which he had seen, years earlier, a real opportunity. Gradually that opportunity has been realized, and it has never lost its appeal, its engrossing interest, and its capacity for real satisfaction in accomplishment.

It was not an easy task to revamp the casual methods which were now hallowed by years of habit and prerogative. It was necessary to educate management as well as the factory personnel, before the new idea became established and won the prestige necessary for its acceptance. Van went about the job methodically, with determination and singleness of

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*"You owe me that new hat, Boss. I just pried
an order out of the old buzzard."*



Photo by Ewing Galloway

The Marketing of COPPER

HAROLD A. KNIGHT

Metals Editor

New York Journal of Commerce

NO commodity bridges remotest antiquity with streamlined today so well as copper, "the everlasting metal." The prehistoric Egyptians, 8,000 years ago, knew how to hammer native copper into small sheets from which they formed knives, harpoons, and other tools. A copper pipe for the rain-water drains of the temple of King Sa-hu-Re at Abusir, made about 2750 B. C., is now in the Berlin Museum. It was analyzed in recent years and found to be 96.47% copper.

American copper mines in the Lake Superior district and in Arizona were worked by the American Indians. Stone hammers and other crude mining equipment have been found in them. Wooden mine supports, turned virtually to paper and crumbling at the touch, were found by the white men in the early days of mining. Moreover, boulders of pure copper were discovered, which had been moved underground but which were too heavy to bring to the surface. The Indian found nuggets of copper at the surface, scratched more from beneath the surface, and eventually burrowed into the ground, following the lode.

Yes, copper, gold, silver and precious stones survive from farthest remote days, but copper has proved the most useful of them all. Gold and silver have survived as symbols of wealth rather than of primary utilitarian value. But during recent years of unstable currencies, many investors, especially abroad, have bought copper, which well lends itself to investment. It is non-destructible, convenient to handle, has myriads of uses, and is a universal metal. Its extreme usefulness depends on its many forms of adaptability, its malleability, moderate hardness, machineability, resistance to corrosion, and its superior electrical properties.

Substitutes have come and gone, but in many uses copper remains supreme. It figures also in many of the latest devices of science and invention. Only recently, the American Telephone and Telegraph Company buried six miles of copper pipe in the waste lands of New Jersey as a ground for transoceanic communication. Television will require thousands of miles of copper tubing for coaxial cables, which best transmit the many wave bands needed.

Ore to Metal

Producers of copper native to the United States must expend considerable labor in extracting copper from the ground and changing it to a metal which is 99% or more pure. In this country the average ore contains 1.6% copper, compared with the newer and richer deposits in the Belgian Congo, which average 4 to 60% copper. Moreover, it often has to do much traveling to reach the various sites where it is refined.

The ore, after removal from the ground, in either open pit or deep mining, is moved to the concentrator, where, by comparatively rough and crude methods, it is separated mechanically from waste and thereupon becomes "copper concentrates." It is then taken to a smelting plant, where, by chemical and physical means it becomes "blister copper," perhaps 98 or 99% pure, so-called because of the blisters and pinholes left upon the surface where air bubbles have left the mass in the Bessemer converter.

From the smelter, the blister copper proceeds to the refinery, where precious metals are separated and further worthless elements removed, the latter process bringing the metal very close to 100% purity. The refinery turns the metal out in convenient shapes and sizes, such as wire bars for the further fabrication into copper wire, or cakes, plates, cathodes, ingots, or ingot bars.

Usually copper is not sold in a merchant manner until it has passed through the refinery. In some cases, however, the ore is sold outright to a smelting and refining company, known as a custom smelter, which subsequently sells it on the open market. Also fair tonnages of blister copper are sold each year for the making of copper sulphate of commercial grade (not the chemically pure product) used widely as an insecticide, particularly in Italy for spraying the vineyards. Copper quotations as published in the newspapers and trade journals refer to the product of the refinery.

This marketable refined copper is usually called electrolytic copper. It may actually be furnace-refined copper, though probably 90% of the refined copper sold in this country is electrolytic. Furnace-refined copper is now produced chiefly in Michigan, and often commands a premium of $\frac{1}{8}$ -cent per pound over electrolytic as some copper users pre-

fer this brand entirely or in small proportions for mixing with electrolytic.

The above summary of copper processes merits more elaboration. Seldom do any two copper producing districts use identical processes, as the nature of the ore requires variation from the regular practice. Even at the same mines, the quality of the ore will occasionally change, inducing engineers to change processes somewhat.

Principal Methods

Generally, the processing of copper from the mining of the ore to its final passage through the refinery falls into one of three distinct series. The first is that used generally in the northern Michigan district. At the smelter, the concentrates are put into reverberatory furnaces, similar to open-hearth furnaces in a steel mill, and melted; the copper sinks to the bottom and the waste material floats on top of the molten mass. The copper is next placed in a Bessemer converter, also familiar equipment of the steel mill, and cold air is blown through it to oxidize the impurities. From the converter it is cast into the commercial shapes of ingots and the like.

In the second chief series of processes, which is adaptable to ore mined from surface deposits, the first step is leaching. The ore is crushed and placed in huge tanks, some holding as much as 10,000 tons of ore. The leaching solutions, containing sulphuric acid, are allowed to percolate through the ore and the copper is taken into solution in the form of copper sulphate. The copper solution passes to the electrolytic tank house, and the waste material is removed by huge excavating machinery and discarded. Thin copper plates or cathodes are placed in the copper solution and an electric current is passed through it, depositing the copper upon these plates. When the cathodes are sufficiently thick, they are removed to reverberatory furnaces, remelted, and cast into commercial forms.

A great proportion of the ore mined in this country is in the form of sulphide, with a high sulphur content. Such concentrates, usually obtained from underground mining operations, are roasted to eliminate some of the sulphur, then melted with proper fluxes in the reverberatory furnaces. A slag and matte are produced, the matte containing copper, iron, sulphur, and possibly gold, silver or platinum, collecting at the bottom of the furnace. In its molten state, the matte is dumped into the converters. A forced draft of air burns out the iron and sulphur. The slag from this operation is usually re-treated to recover stray residual amounts of metal. The main body of the copper is now blister copper, about 98% pure, containing other valuable metals. It is formed in pigs or cakes about 12 inches wide, 20 inches long, and 3 inches thick, and shipped to the refineries for further purification.

At the refinery, the blister copper is melted and

This is the ninth article in a series outlining the marketing process in major raw materials, tracing the course of the material from its source to the time of its arrival in the industrial user's plant

cast into anodes about 36 inches wide, 42 inches long, and 1½ inches thick. Thousands of these are suspended in tanks containing an electrolytic solution of sulphuric acid, bluestone, water, and a little salt. The copper is taken into solution at the anode, or positive pole, and emerges at the cathode, 99.93% pure, while the precious metals and impurities drop to the bottom of the tank for further refining.

An important adjunct of many concentrating plants is the flotation process, which makes it possible to use leaner ores than would otherwise be practicable. The ore is crushed to a finer degree than in the ordinary concentration process, and is passed through a flotation machine containing water and small amounts of special oils. The mixture is subjected to a violent agitation. The tiny globules of oil and wet mineral particles float to the top as a froth, while the non-metallic particles

drop to the bottom. Eventually the products of the flotation process are joined with those from the ordinary concentration, and together they go to the smelter.

Production

Normally, about 50% of the refined copper produced is in the form of wire bars, though producers state that it so happens in the first part of 1939 wire bars account for only about 40%. In other words, copper wire manufacture has been below normal in recent months. About 20% goes into cathodes, which are destined to be remelted into more final semi-finished forms. Another 20% goes into slabs and cakes, to be rolled later into sheets and strips. A small percentage goes into ingots and ingot bars, the latter being ingots joined together, but readily broken apart, all being designed to be remelted and used chiefly for alloy and cast-



At left: Electrolytic process of refining copper, at Anaconda's Raritan Works. Below: Copper bars ready for shipment at Calumet, Michigan.

Photos by Gallorway



ing purposes. Very small amounts are formed as special shapes, including billets and anodes. The crude blister copper which is sold before the refining process is in the form of rough cast pigs, weighing 250 to 350 pounds each.

In the copper industry, one often hears the lament that sizes of the common forms of electrolytic copper are not standardized in the United States. The English mills almost exclusively take wire bars weighing 135 pounds; German mills have standardized on the 175-pound bar; French mills are approaching standardization on 265-pound bars. But in the United States, sizes are far from uniform. There are 200, 300, and 400-pound wire bars, and the passage of time does not find harmony. Each wire mill is of its own individual size and can best handle bars of a certain weight. One suggested reason for the largest size wire bar is that in certain mills labor is paid by the bar.

The American Bureau of Metal Statistics, in its annual book on metals, lists twenty-two "principal copper producers in the United States." Of course there are many other small companies who merely mine the ore and have it smelted and refined by the larger companies.

Seventeen smelters of copper are listed, but the American Smelting & Refining Company is named five times, one for each of its smelters, located at El Paso, Texas; Garfield, Utah; Hayden, Arizona; Barber, New Jersey; and Tacoma, Washington. This company is the leading custom smelter in the United States, owning practically no mines, and serving chiefly as a processor and seller of the finished product.

Ten companies are listed as refiners of copper, the American Smelting & Refining Company appearing twice, first as owning plants at Baltimore and at Barber, New Jersey, and second, at Tacoma, Washington.

At the end of 1937 there were 36 reverberatory furnaces at smelters in the United States, with an annual capacity of 9,186,000 tons of ore or concentrates; also 62 converters, with a capacity of 533,800 tons per year.

Usually the larger refining companies serve several other mining and smelting companies. Thus the Nichols Copper Company (which has technically lost its identity and is a part of the Phelps Dodge Corporation) at its Laurel Hill, L. I., refinery refines copper for the Magma, Miami, Phelps Dodge, Tennessee, Pyrites, Shattuck Denn Companies, and for two foreign companies, the Compagnie Francaise des Mines de Bor, and the Compagnie Miniere du M' Zaita. On the other hand, the Calumet & Hecla Consolidated Copper Company at Hubbell, Michigan, treats only its own copper.

There is also considerable consolidation in selling efforts. Thus there are ten "principal sellers of copper in the United States," selling for some

thirty producers. The Anaconda Sales Company is listed as mothering the greatest number of brands under its wings: Anaconda, Andes, Cananea, Chile, Inspiration, Mountain City, North Butte, National Tunnel, and Walker Mining companies, most of these being subsidiaries of the Anaconda Mining Company.

There are some sixty companies which are generally recognized as principal buyers of refined copper. About 90% of the consumers are located east of the Mississippi, hence refining plants on the Pacific Coast usually fill orders for the Far East or ship to the eastern seaboard of the United States via the Panama Canal.

Custom Smelters and the Market

Copper producers and sellers are divided into two classes: mine, or primary, producers, so called because they smelt and refine the ore from their own mines; and custom smelters, of which there are four, headed by the American Smelting & Refining Company, who make their profits mostly from the processing of the copper. The custom smelter may be compared to the old flour mill of former days. The farmer took his wheat to the mill, had it ground into flour, and paid the miller a percentage, either in flour or in cash.

Custom smelters have various arrangements with their customers. Sometimes they buy the ore outright; sometimes they smelt and refine it and turn it back to the original owner for a "toll". The tendency, however, is to let the custom smelter sell the metal as well as refine it. Custom smelters are often a disturbing influence on copper markets. Since their returns are usually the same, no matter what the sales price, they are not particularly interested in maintaining a high sales price. Consequently, during dull markets, they are usually the first to cut prices.

Moreover, where they buy ore outright, they pay for it on the basis of the selling price for refined copper. When they feel that prices of the latter are destined to retreat, they do not care to load up with what may prove to have been high priced ore. Therefore they may reduce their price for refined copper to lower the price of the ore which they are taking into their smelters.

Last April the copper market was going through the stages of a price reduction, led by custom smelters. At the beginning of the month, all copper producers were still quoting 11¼ cents, a price prevailing since the middle of October. However, in a series of declines, invariably led by the custom smelters, prices dipped to 10 cents by April 21. The mine producers are usually compelled to follow the custom smelters, though occasionally they wait a while, hoping that the custom men will start advancing again. This sometimes happens quite soon after drastic reductions, since Americans seem

Continued on page 97

PUBLISHERS'

Announcement

The addition of PURCHASING Magazine to the roster of Conover-Mast Publications is an important step which will have mutual advantages for all concerned. The splendid services rendered by the publication during its past history have merited and won the approval and support of industrial buyers in every manufacturing district. The capable staff has made this publication an outstanding influence for progress and improvement in the science of purchasing practices, amply aided by the cooperation of purchasing leaders throughout the nation.

This record of high achievement will be maintained during future months. In addition, staff members have made valuable suggestions for increasing and improving the editorial features of the magazine. Many of these plans had been on their drafting boards for months, but the facilities of a larger publishing organization were needed to transfer the ideas from the drafting board stage to actual publishing practices. The publishers therefore, are happy to welcome the staff members of PURCHASING Magazine to the Conover-Mast organization and we hope that every reader will feel free to call upon us for any or all of the facilities of the company whenever your requirements create a need which we can fill.

Indeed, we further hope that every reader of PURCHASING Magazine will look upon this new affiliation of the publication as an opportunity for us to make available to you any services which purchasing executives need which are not available from other sources. Your requests for information will receive prompt attention. Your suggestions of subjects for future editorial treatment will be most carefully considered. Your proposals of research projects to obtain heretofore unavailable information will be welcomed.

Furthermore, PURCHASING Magazine now maintains, in addition to its previous facilities, an important office in Washington, D. C., which is utilized as an editorial service bureau. Special information service regarding national affairs is therefore available to you without cost or obligation. We urge every reader and advertiser to take advantage of these new facilities by writing to the editors whenever a problem occurs which you believe PURCHASING Magazine can solve.

HARVEY CONOVER, *President and Treasurer,*

B. P. MAST, *Vice President,*

HARTLEY W. BARCLAY, *Secretary.*

THE MARKET PLACE



*A quick review of the market
noting major developments in
supply, demand and prices of
selected basic commodities*

Supply

BURLAP

U. S. STOCKS of burlap were down to 260 million yards, spot and afloat, at the first of August, a shrinkage of 17% since the first of the year. This represents 5½ months' supply at current rates of use, but is the lowest practicable inventory level to maintain a domestic trading basis. In fact, there are spot shortages on some constructions now. Offerings at Calcutta were temporarily withdrawn during the last week of August.

COAL

OUTPUT of bituminous coal expanded during August, from 7,350,000 net tons in the opening week, to 7,600,000 net tons in the closing week. For the calendar year to date, total 1939 production is 10.2% greater than in 1938, despite the protracted shutdown of operations during the second quarter of this year. Industrial stocks in the U. S. show a substantial gain, though railroad stocks are lower; Canadian stocks are also substantially higher. Anthracite production is expanding slightly, and coke production is currently running 54% ahead of the 1938 rate.

COPPER

AUGUST copper statistics showed world stocks of refined metal down 23,251 tons in July, to 490,419 tons, the lowest figure of the year, and equivalent to only six weeks' supply, or about half of normal. U. S. stocks accounted for 18,469 tons of this drop. Blister stocks rose 5,915 tons. The International Cartel raised production quotas on August 16th from 95% to 105% of standard, and at the end of the month was considering the removal of all restrictions in view of wartime demand and of increasing exports from this country. Meanwhile Britain is barring all exports of the metal.

Demand

DOMESTIC cutup of burlap, upon which consumption statistics are based, continued at the low rate of 47 million yards per month, the lowest rate in more than a year. U. S. consumption for the year to date is slightly off—about 1%—from the corresponding figure for 1938. Buying interest is considerably more active than in recent months.



INDUSTRIAL consumption of bituminous coal has been steadily broadening, and while there has been a seasonal lull in some manufacturing classifications, this deficiency has been more than offset by substantial increases at beehive and by-product coke ovens, cement mills, and electric power utilities. The greater consumption has been met entirely from current production, as stock piles have also been built up to a level representing 39 days' supply.

FOLLOWING two months of exceptionally heavy domestic sales of copper, the August total was down to 40,000 tons, but this is scarcely a true measure of the market. Consumption was nearly 50% greater than this figure, deliveries the largest since last October, and unfilled orders on hand for more than four months' output. Brass mill operations are up to 70%, a two-year high. Foreign demand, heavier than usual, reached really feverish proportions on the eve of war, and U. S. exports are running 20,000 tons monthly as compared with a normal 8,000 tons.

Market

QUOTATIONS on burlap strengthened materially in August, chiefly on war news and the possibility of restricted supplies reaching this country. In view of the lack of actual offerings and Calcutta cables in the closing week, the quotations may be regarded as nominal, but the market is nevertheless strong. The advances, most of which were recorded in the second half of the month, show a rise of 20 to 30 points on spot quotations, and 5 to 15 points on forward contracts.

THE coal price list continues without change pending the results of the final price hearings at Washington and the effective date of minimum determinations. Steps have been announced pointing to a considerable simplification of the proposed schedules, covering more than 300 sizes from 7,000 individual mines of varying quality in the Appalachian region. Marketing experts are now breaking this down into groups embracing from 5 to 47 sizes recognized as having an equal value in the market, for each producing district, with price differentials for quality.

THE 10½-cent price on copper ruled firm throughout August, with resale copper available at ⅛-cent under the market. At the turn of the month, successive price advances, quickly brought the quotation up to 12 cents. Foreign quotations, though complicated by unstable currencies, were at a comparable level. The very favorable statistics and sustained demand strengthened the price position of this commodity, and in view of these factors the market was notably steady. Domestic consumers are of course covered for some time to come at the 10½-cent level.

COTTON

THERE is little new on the supply side of the cotton market. Stocks of the staple are more than adequate. In textiles, the curtailment of mill operations has merely kept pace with the mid-summer buying lull and is capable of immediate expansion if requirements justify such action.

IRON and STEEL

STEEL output advanced strongly in August. At mid-month, recording the sharpest advance in many weeks, the operating rate reached 62.1% of capacity, a new high for 1939. There was a leveling out at this level, but going into September the rate had advanced to 63%, the highest figure reported since October, 1937. A large part of this production was in fulfillment of the low-price sheet orders of last May, but that particular factor is fairly well completed, and a deadline of September 30th has been set for all specifications against those orders, excepting for automobile steel.

LUMBER

LUMBER output was slightly down at the beginning of August, and held steady at that level—66% of 1929 seasonal average production—throughout the month. For the year to date, production is 14% ahead of 1938. Stocks are down 5% from the first of the year, the reduction being chiefly made in the first quarter.

NAVAL STORES

STOCKS of naval stores at southern markets declined fractionally in August, but not enough to relieve the topheavy situation. Most notable factor in a generally featureless situation is the almost total absence of turpentine offerings, which has had no effect whatever upon the market.

PAPER

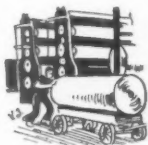
PRODUCTION of paper rose in August to a rate substantially above July levels, though not quite up to the March-April peak. Paperboard manufacture went ahead more rapidly, attaining the highest rate since August 1937. Groundwood papers were produced in exceptionally good volume, close to 90%. Supplies of imported pulp may be seriously curtailed as a result of European hostilities.

CONSUMPTION was better than had been anticipated and the young 1938-1939 season is running close to 20% above the volume of the previous year. Inquiry in the primary market fell off on war fears during August, but recovered in the closing days on large speculative buying orders.

DEMAND was well diversified, the weak spots being in plate, tin plate, and jobber trade. Tin plate in particular has been disappointing, operations dropping from 70% to 65% during the month, accompanied by strong price pressure. An encouraging feature is that the major support from the automobile industry is still to be felt, and is counted on to be an important sustaining factor in the fourth quarter. Rail demand is developing slowly; shipbuilding shows active gains; oil country products have also been in good volume. Up to the 1st of September, no exceptional export demand was reported.

THE Lumber Survey Committee of the Department of Commerce projects consumption trends for 1939 to indicate a yearly total between 10 and 15% ahead of 1938, and 5% below 1937. New orders in August registered a new high for the year. Buying is still on a hand-to-mouth basis, which has not tested the adequacy of present stocks.

DOMESTIC demand is more than seasonally dull. Exports for the first half year were down 9% from 1938, a serious situation since these materials depend on exports for an outlet of one-third of total production.



SALES volume was maintained in August with no important changes, but with a generally firm tone and optimistic outlook for the balance of the year. In paperboard demand was notably brisk, some grades registering a volume close to the high record for this industry.

SPOT COTTON prices sagged in August, dropping below 9 cents in the second week and below 8½ cents in the fourth week. There was a rally in the closing days of the month, but a net loss of ½-cent was recorded. Textile prices were firmly held and are apparently in strong position.

THE steel price situation shows firmness, though it is conceded that the list has not yet faced a real test, since perhaps the bulk of present shipments are on the old scale. New orders, however, are reported as booked at the current schedule, and the only heavy pressure for reductions is coming from tin plate users. New quantity extras on hot-rolled alloy bars were announced late in August, and a corresponding revision on cold-rolled products is expected this month. The prospect of a general price revision for the fourth quarter depends entirely on the extent to which normal and wartime demand warrant such a step.

WHILE hardwood prices continue on a nominal basis, unchanged, softwoods continued to show recovery from recent lows. Southern price quotations advanced at mid-month by approximately 1½% and held the gain, though showing no particular strength.

TURPENTINE prices have been practically unchanged since the middle of July, chiefly since there has been little trading to establish a free and responsive market. Common grades of rosin were also unchanged; medium and fine grades lost from 15 to 25 points during the month.

THE general paper price list is unchanged, but decidedly buoyant except for newsprint, on which a routine condition prevails. There have been upward revisions on boards, with news and chip board now quoted at \$32.50 to \$35.00 a ton, up \$2.50. There have also been moderate advances in waste paper. The pulp market may face the most drastic mark-up in view of war conditions.

PETROLEUM

OUTSTANDING feature of petroleum supply during August was the 15-day suspension of production in six southwestern states following a runaway period of crude output and a threatened price demoralization. The move was initiated in Texas, following a special meeting of the Interstate Oil Compact Commission, and similar action was promptly taken by Oklahoma, Kansas, New Mexico, Louisiana and Arkansas, despite vigorous opposition by some of the producers. The immediate effect was to cut production in half. The daily average output in the week ending August 5th was 3,909,000 barrels. Three weeks later, the figure was 1,690,000 barrels. The run to stills was not affected.

THERE was a quickening of demand for refinery products during the early days of the shutdown, in anticipation of higher markets for all petroleum products, but after the first response a more normal trend was resumed, and volume became lighter as buyers awaited developments. The course of consumption follows a fairly well defined line, and supply rather than demand is the key to this market. Heavy foreign buying of motor fuel and fuel oil is expected as a result of the European war.



THE long threatened collapse in crude oil prices came on August 12th, when the Sinclair Prairie Oil Marketing Co. posted a 20-cent reduction. Within three days most of the major producers had met this slash, and the effect was felt in softer prices throughout the industry. As the shutdown became effective, a stronger tone became apparent. The crude price was restored on the 23rd. Gasoline bulk prices advanced 3/10 of a cent per gallon. No. 2 heating oil was raised 1/8-cent and kerosene was up 1/4-cent. Pennsylvania grade lubricating oils advanced 1 1/4 to 1 1/2 cents per gallon. All of the increases were firmly held at the end of the month.

RUBBER

SUPPLIES of rubber in all major consuming countries were down to critically low levels in August. Great Britain, with less than six months' normal peacetime requirements, was particularly concerned. The increased quota for the second half year had not yet afforded much relief, and there is strong pressure for a further liberalization of shipments. First of the month statistics from Malaya showed production up sharply, chiefly in native production, and dealers' stocks were also larger. With the outbreak of hostilities, availability rather than statistical tonnage was the important factor.

ACTUAL consumption for the year to date is 21% ahead of 1938, a fact accounted for entirely by U. S. consumption, which was up 50.8% in the first half year. Other users were below their 1938 figures. Wartime requirements naturally changed this situation decidedly. Demand became very active in the second half of the month, and frantic in the first week of September.



RUBBER prices fluctuated only narrowly throughout August, ranging from 16 1/8 to 16 7/8 cents even with very active buying by Germany in the closing week. At the turn of the month, however, with war a fact instead of a fear, heavy speculative trading added its force to consistent factory demand, and the spot price was run up to 19 1/2 cents. In the commodity rise of early September, quotations advanced by the daily limit allowed on the exchange, and the spot price went to 25 cents overnight with offerings limited at that figure.

TIN

THE tin market in August was not very significant in view of the very limited offerings. Futures transactions were hampered by a lack of quotations on sterling futures. World stocks were down 11%, to 21,206 tons. August deliveries to America amounted to 8,275 tons, the largest volume reported since October, 1937.

THE usual practice of buying on declines was impracticable last month, for on the downswings no metal was being offered. This gave rise to an increasing inquiry for spot metal toward the end of the month, which assumed frantic proportions with the advent of war and the recognition of a serious scarcity in world markets.

TIN prices ranged between 48 1/8 and 47 7/8 cents for the greater part of August, with no very definite trend observable. At the turn of the month, tin was a leader in the abrupt price advance among metals. The market was confused, with many dealers declining to commit themselves on price, but with 59 cents posted as the nominal level.

ZINC

DOMESTIC production of zinc was maintained at steady levels in August, conceding the fact of imported metal in this market and declining to set up larger stocks that might have a depressing effect. The backlog of orders was healthy. With a substantial part of foreign supply now cut off, production is being expanded rapidly at domestic mines.

DEMAND was of a routine nature through August, but became feverish in the early days of September. Consumption is steadily expanding. Galvanized sheet operations have been increasing since the middle of June. At 63% in mid-August, they set a new high rate for this year, and went on to 64% in the second half.

THE price of slab zinc was raised early in August from 4.60 to 4.75 cents per pound, East St. Louis, and in the general advance at the beginning of September, quotations went on to 5 cents, and then to 6 cents. The price of ore was raised proportionately, concentrates and flotation ore being quoted without the usual differential.



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Almost everything in life today depends on steel--the clothes we wear, our transportation, the buildings we work in, the appliances that make modern life easier are of steel or made by steel machinery.

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25-15B

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● At the Machine Tool Show in Cleveland, October 4th to 13th, you will have an opportunity to inspect the newest developments in machine tools. You will see many of these machines in operation, setting new high records of production efficiency. You will be face to face with new possibilities for cutting the cost of producing the parts you make.

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Warlike activity necessitates postponement of Machine Tool Show — makes facts on these pages of even greater importance to you.

degree whether you realize their fullest potentialities for increased efficiency, cost reduction and product improvement.

If, on the other hand, you decide to continue to use your present machines, you will wish more than ever to probe the possibilities for speeding up production, reducing costs and improving the quality of their output. Even though they are running at full capacity and top speeds, you still may be able to gain profitable results by a change of steel or setup.

In either case, remember that Union Cold Drawn Steels are processed to bring greatest production efficiency, highest product quality and lowest parts costs to users of both old and new equipment. Union Drawn Field Service Men, drawing from the practical experience of many years of service to parts producers, are ready to cooperate with you in selecting the most efficient steel and in helping your men to establish the most profitable machining and fabricating practices. Union Drawn Steel Division of Republic Steel Corporation, Massillon, Ohio.

UNION COLD

When you are in Cleveland, don't fail to see the world's widest and fastest continuous strip mill in operation. Trips daily at 2 P. M. Call DIamond 2900 to register.

To the Man WHO CANNOT ATTEND THE MACHINE TOOL SHOW

● While you are unable to attend the Machine Tool Show at Cleveland, you undoubtedly are keenly interested in the new developments in machine tools to be shown there. You will read about them in the trade papers and see them illustrated in manufacturers' advertising and literature. You will become acquainted with the possibilities they offer for improving your product and your shop costs.

If, as a result, you decide to install some of this new equipment, keep in mind that while new machines are designed to operate more efficiently, the final result will be dependent to a large extent upon the steel you use.

If, on the other hand, you continue on with your present equipment, the problem of turning out fine quality parts

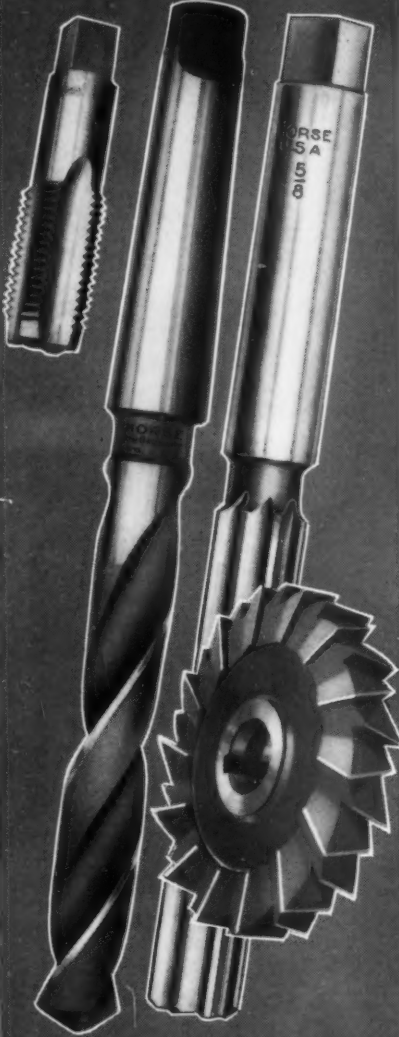
at fullest machine capacity and minimum cost becomes an important consideration. Here, again, the steel you use is a vital factor in determining speeds, feeds, production efficiency and unit cost per piece.

For years, Union Drawn has specialized in providing machine tool users with cold finished steels that enable them to produce better steel parts faster and at lowest possible cost. Union Drawn Field Service Men — old hands at licking steel selection and fabricating problems — will be glad to cooperate with you in picking the right steel and developing your machining practice to get the most out of equipment of any type or age. Union Drawn Steel Division of Republic Steel Corporation, Massillon, Ohio.

DRAWN STEELS



BESSEMER STEELS
Freecut (S. A. E. 1112) • Supercut (S. A. E. X-1112)
OPEN HEARTH AND ELECTRIC FURNACE STEELS
All Carbon and Alloy Analyses



**KEEPING PACE With
The WORKHEAD**

— with its increased efficiency — is a job worth the best that any small tool line can deliver.

Morse Tools have kept pace with industrial development for generations . . . supplying the necessary qualities to maintain high production.

MORSE

THERE IS A
DIFFERENCE

**TWIST DRILL AND
MACHINE COMPANY**
NEW BEDFORD, MASS., U. S. A.

NEW YORK STORE: 130 LAFAYETTE STREET
CHICAGO STORE: 570 WEST RANDOLPH STREET

Personalities in the News

J. LEO LONERGAN, for many years purchasing agent of the Morris Machine Works, Baldwinsville, N. Y., has been appointed vice president and general manager of that company. He is succeeded as purchasing agent by WALTER McCARTHY. Mr. Lonergan was one of the charter members of the Syracuse & Central New York Purchasing Agents Association and has served as vice president of that organization.

WILLIAM CLOUGH, for the past five years purchasing agent for Braniff Airways, at Dallas, has resigned to take charge of parts sales, service and purchasing for the Glendale (Calif.) Airport.

J. E. WOOD of Medford has been appointed assistant purchasing agent for the State of Oregon. Mr. Wood was formerly State Purchasing Agent for Montana, having organized that department in 1921, and has 35 years of business experience. He has been a resident of Oregon for the past nine years.

LEIF JENSEN has been appointed purchasing agent for the Northwestern Woodenware Co., Tacoma, Wash., succeeding Gil Waite, who has been transferred to sales work for the company.

F. J. PALANK has been appointed Seattle purchasing agent for the Broderick & Bascom Rope Co., succeeding C. L. Wight.

CHESTER C. COOK has been appointed purchasing agent for the City of Berkeley, Calif., succeeding H. L. Davisson, who resigned to enter private business.

FRANK P. CRAIG, formerly of the Palmer Electric & Mfg. Co., has joined the purchasing staff of the Boston Edison Co.



C. REESE

C. REESE, who served as purchasing agent of Continental Motors Corp., Detroit, from 1932 to 1936, and as vice president and general manager since that time, has been elected president of the company, succeeding W. R. Angell, who will continue in the post of technical adviser. Mr. Reese is also a director of the Lakey Foundry & Machine Co.

JOHN CRAWFORD, purchasing agent of the Sun Life Assurance Co., Montreal, was elected second vice president of the National Office Management Association at the recent annual meeting in New York City.

WILLIAM SELDON, assistant purchasing agent of W. F. Schrafft & Sons Corp., Boston, has been elected vice president of the Union Federal Savings and Loan Association of that city.

O. E. McCLATCHEY, Purchasing Agent of the Barnsdall Oil Co., spoke at the recent forum meeting of the Tulsa Chamber of Commerce, on the topic, "Tulsa as the Oil Capital."

DOUGLAS C. MacKEACHIE, New England Purchasing Agent for the Great Atlantic & Pacific Tea Co., was chairman of the marketing committee of the New England Council, which spon-



Announcement

NATIONAL ADHESIVES CORPORATION

has changed its name to

NATIONAL STARCH PRODUCTS INC.

as of September 1, 1939



IN RECENT YEARS, in addition to manufacturing our quality adhesives, gums, pastes, and sizings, our company has become an important factor in the manufacture and processing of starches for foods, confectionery, textiles, and papers, as well as in the production of lacquers, thermoplastics, and similar materials.

For these reasons we have decided to change our name to NATIONAL STARCH PRODUCTS INC. and will continue to manufacture a full line of adhesives as heretofore, operating as NATIONAL ADHESIVES DIVISION of NATIONAL STARCH PRODUCTS INC.

We also announce the purchase of PIEL BROTHERS STARCH CO. of Indianapolis, which will be operated as a division of NATIONAL STARCH PRODUCTS INC.

Thanks to our many friends for the confidence which has made possible our steady growth and expansion.

NATIONAL STARCH PRODUCTS INC.



sored "New England on Display" week, August 7 to 14, when 14,000 chain and independent stores exhibited the products of that area in their window displays.

WHITLOW K. PERKINS has been appointed City Purchasing Agent at San Antonio, Texas, succeeding ED SIEBRECHT, who has held the position for the past five years and is relinquishing the responsibility

because of illness. Mr. Siebrecht is still associated with the department in an assistant capacity.

FREDERICK L. BARLOW has been appointed General Purchasing Agent for Canadian Industries, Ltd., Montreal, succeeding the late John Russell. Mr. Barlow has been with the company since 1920 and for the past seven years has been assistant general purchasing agent.



FRED HAGEDORN

FRED HAGEDORN, for the past three years purchasing agent for P. Ballantine & Sons, Newark, N. J., has been appointed purchasing agent for Piel Brothers, brewers, of Brooklyn, N. Y. Mr. Hagedorn has a long experience in the brewery industry, having engaged in the export of brewery machinery and supplies and in plant design and modernization for twenty years before entering purchasing work.

A. M. HOLMES has retired as purchasing agent for the Lehigh & Hudson River Railway Co., Warwick, N. Y., after 49 years of continuous service. He became purchasing agent and paymaster in 1905, and since 1908 has devoted all of his time to the purchasing department.

THOMAS D. HUDSON has been appointed purchasing agent of the Pittsburgh & Conneaut Dock Co. and the Pennsylvania & Lake Erie Dock Co., with offices at Conneaut, Ohio.

ROBERT J. RILEY of Gladstone, Mich., has been appointed Chief of Specifications and Inspection for the State of Michigan, a newly created office which supplants the former position of Director of Purchases, held by Grant M. Hudson up to the time of his recent resignation, and also embraces the purchasing functions of the secretary of the State

Tuned for Speed

The secret of aviation progress lies in scientific control. The speed and efficiency of the modern plane has been attained only through exact methods of control at every stage of production. In the same way, Delta Files, in the chain of processes by which they are made, have raised their performance. Improved tooth form, hardness and toughness, and the microscopic uniformity between each tooth and its neighbors, assures that all teeth shall wear alike and none shall fail prematurely.

As a result of this persistent care and exactness, the average level of performance has been astonishingly raised.

Both in SPEED of cutting and in endurance, careful tests have shown Deltas lead the best of other brands by wide margins. And no other brands show such consistent duplication from box to box.

Try Delta Now! Start saving money!

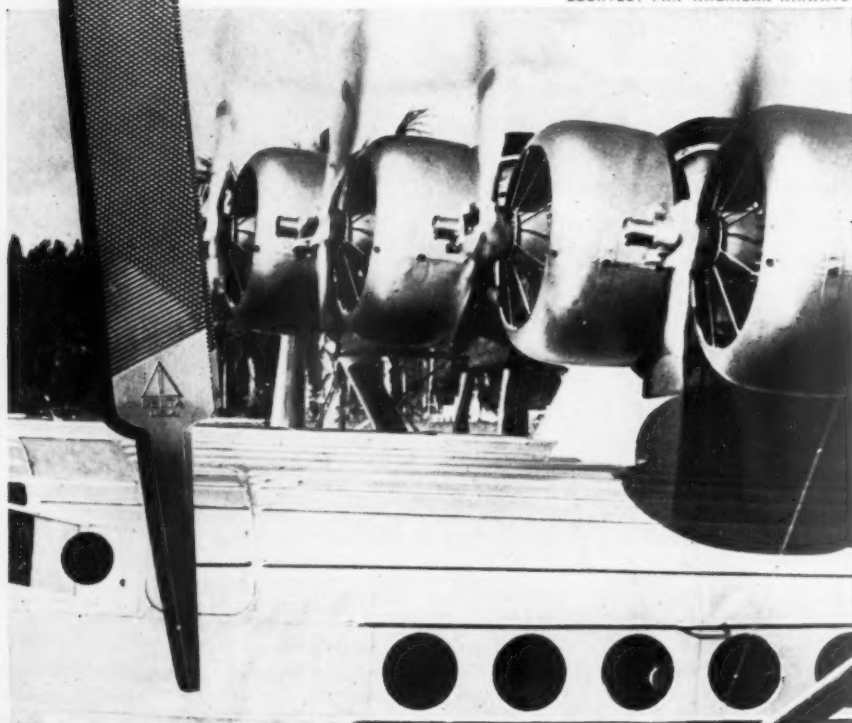
Ask the nearest Delta distributor about our trial offer on a dozen files for comparative test.

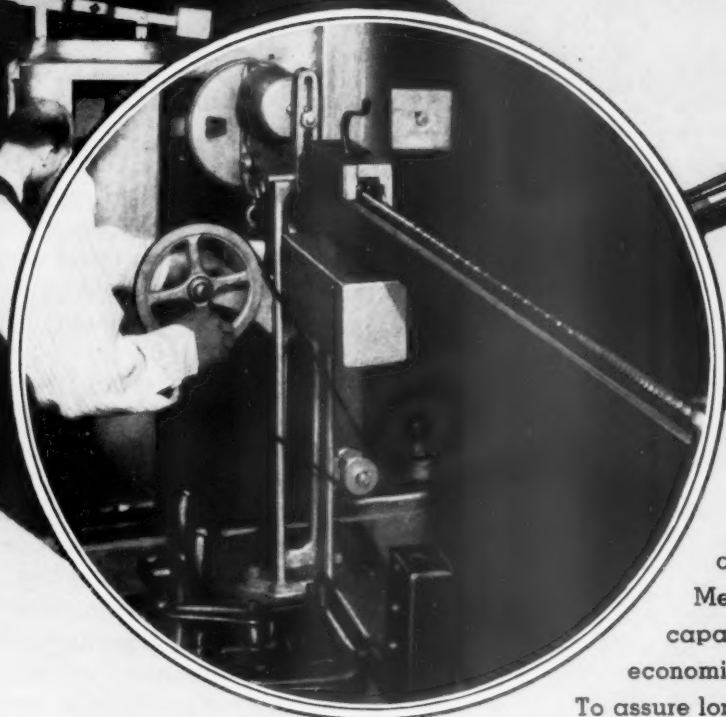


DELTA FILE WORKS
BRIDGESBURG PHILADELPHIA



COURTESY PAN-AMERICAN AIRWAYS





● In the wide range of uses to which Mechanical Rubber Products are put, many conditions arise which momentarily cause exceptional stress and strain on either Belting or Hose. Unless the Mechanical Rubber construction has a built-in reserve capacity for handling such unusual jolting and abuse—economical, trouble-free operation is impossible.

To assure long, dependable service life of Republic Belting and Hose, complete allowance is made, during manufacture, for extremes of service requirements. For example, in the oil fields, accidental stoppage of rotary drilling operations is frequently caused by unfavorable geological formations. The result is that pressures are built up which require extraordinary strength in the Rotary Hose to prevent rupture. Republic's Champion Rotary Hose offers the fullest protection with a construction designed to withstand tests far exceeding the pressures of the intended use. Further, on Transmission Belt drives, sudden starting or stopping of machinery and other shock loads place a severe burden on Belting. Republic Challenger Transmission Belt is subjected to final tests exceeding ten times the normal stress required on the job, before it leaves the factory. It is this enlarging of actual operating conditions in designing and testing that gives Republic Mechanical Rubber Goods their maximum serviceability. Republic Rubber Division of Lee Rubber and Tire Corporation, Youngstown, Ohio.

WE MAGNIFY SERVICE CONDITIONS

In Testing Republic
Mechanical Rubber
Products

ORDER
REPUBLIC
RUBBER
PRODUCTS
FROM YOUR
DISTRIBUTOR



REPUBLIC RUBBER

HOSE • BELTING • PACKING • MOLDED PRODUCTS





How can I cut down rejects?

"TRY G-E LIGHT-CONDITIONING!"

*says Belmont Radio Corporation . . .
and proves it with increased production*



**MORE LIGHT FOR
YOUR MONEY**

because
**THEY STAY
BRIGHTER LONGER**

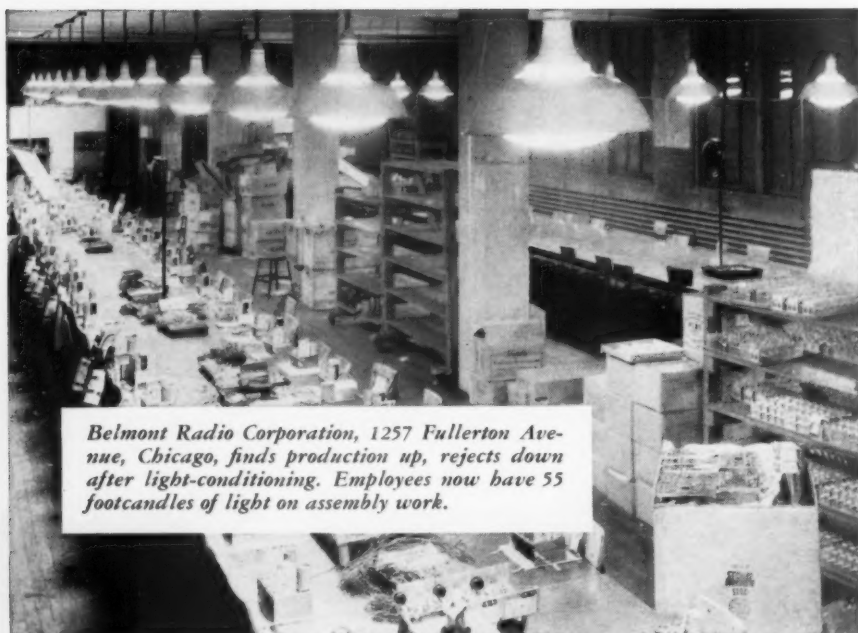
DOES better light actually increase production?

The Belmont Radio people were skeptical . . . until they had a trial fixture demonstration. Now, with 55 footcandles of light on assembly work, they report a definite decrease in rejects per unit production.

How is the lighting in *your* plant? Have employees enough light so that no unnecessary time is lost . . . so that no mistakes are made that could be avoided through better seeing conditions?

Your local electric company will measure your lighting free of charge. But whatever your problem, you'll get more light for your money if you use G-E MAZDA lamps. They're more efficient than ever this year—and they stay brighter longer!

G-E MAZDA LAMPS
GENERAL  ELECTRIC



Belmont Radio Corporation, 1257 Fullerton Avenue, Chicago, finds production up, rejects down after light-conditioning. Employees now have 55 footcandles of light on assembly work.

Administrative Board, Lawrence H. Niendorf. The new office is responsible directly to the purchasing committee of the State Administrative Board.

HERMAN LANDGRAF, State Purchasing Agent for Rhode Island, gave a radio report on the operations of his department, August 11th, advising the citizens that savings averaging 25% had been effected on the cost of all supplies purchased over the past six months.

ROLAND M. BRENNAN has been appointed purchasing agent for the District of Columbia, succeeding MARION C. HARGROVE, who will retire on December 1st after 52 years in District service, including 28 years as purchasing officer. Mr. Brennan has been secretary of the Board of Commissioners since 1935, and prior to that was chief clerk in the engineering department.

HAROLD K. LA ROWE, Assistant Purchasing Agent of the Dairymen's League Cooperative Association, and President of the New York Purchasing Agents Association, is one of the committee judging industrial advertisements exhibited at the 1939 Conference of the National Industrial Advertisers Association in New York City this month.

JOSEPH V. O'LEARY of New York City has been appointed Superintendent of the Division of Standards and Purchase for the State of New York, filling the vacancy caused by the death of Charles Bennett Smith last May. Mr. O'Leary is a graduate of Manhattan College and Fordham Law School, and was the candidate of the American Labor Party for State Attorney General in the 1938 election.

GEORGE EBERLE has been appointed purchasing agent for Maricopa County, Arizona, a position newly created by the Board

NORTON
RESINOID BOND
plus

NORTON ABRASIVES

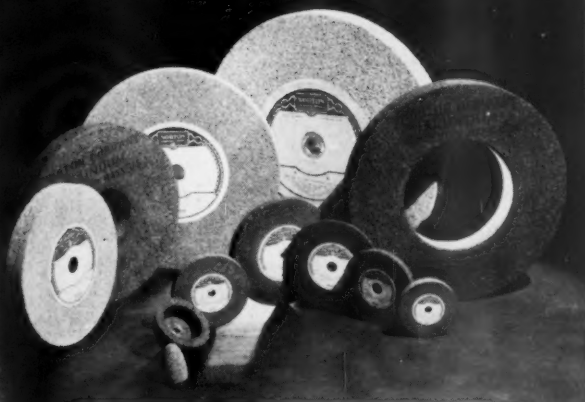
*Can Cut Your
Grinding Costs*

A PRODUCT of modern research—that's a true description of Norton Resinoid Wheels for foundry grinding. In the Norton laboratories there's a group of scientists that specializes in resinoid bond development. Not only have they made many important improvements in the bond formulae but have also developed an elaborate control system that improves production quality and uniformity.

These laboratory developments coupled with an entirely new production department with the very latest available equipment have resulted in new standards of quality for resinoid wheels — wheels that are cutting cleaning room costs for many foundries. Let Norton engineers study your jobs and give you the benefit of these improved wheels.

NORTON COMPANY
WORCESTER, MASS.

New York Chicago Detroit
Philadelphia Pittsburgh Hartford
Cleveland Hamilton, Ont.
London Paris Corsico, Italy
Wesseling, Germany



There's a complete line of
Norton Wheels for every
job in the foundry

W-709 •



of Supervisors. Mr. Eberle was formerly City Purchasing Agent at Phoenix.

WILLIAM J. DEVINE has completed thirty-five years as purchasing agent for the Hartford (Conn.) Hospital. He is a former secretary, and at present a director, of the Hartford Rotary Club, and served the city for six years as a charity commissioner, being president of the board in 1923 and 1924.

HARRY E. ROSS has been appointed purchasing agent of the Ohio Finance Co., Columbus. He has been manager of the company's printing department and will continue in that capacity.

A. G. KAHL, formerly chief buyer for the Union Oil Co., has been named district purchasing agent at San Francisco, succeeding H. B. AMIDON, who retires after twenty-six years of service with the company. C. S. PER-

KINS, who has been assistant general storekeeper at Santa Fe Springs, becomes district purchasing agent and general storekeeper for that district.

V. H. McKIMMEY, for the past several years purchasing agent for Lucey Products Corporation, Tulsa, has been transferred to the sales department of that organization and assigned to the Fairfield, Ill., office.

No "B'Guess and B'Gosh"

IN THE STEEL WIRE FROM WHICH
THESE SOCKET SCREWS ARE MADE!

CHEMICAL ANALYSIS in Parker-Kalon's Laboratory protects users of Parker-Kalon Cold-forged Socket Screws against "follies". It governs the "prescription" for the special chrome nickel alloy PARKALOY. It checks the rolls of PARKALOY wire as they come from the mill... makes certain that all the necessary elements are present and in correct proportion.



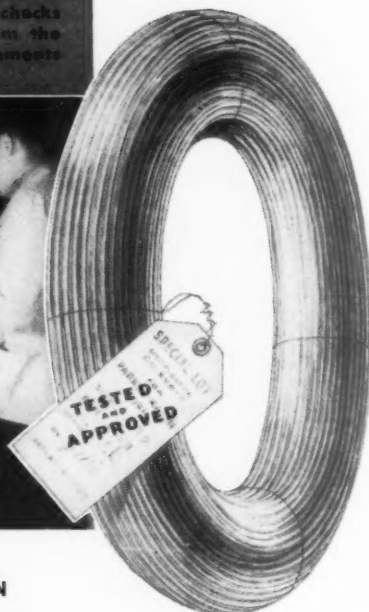
"16 POINT QUALITY-CONTROL" Leads Critical Buyers to Demand PARKER-KALON

Chemical Analysis is only one of 16 check-ups on important characteristics of Parker-Kalon Cold-forged Socket Screws. In a laboratory without counterpart in the industry, quality is guarded by thorough tests and inspections covering:

1—Chemical Analysis. 2—Tensile Strength. 3—Ductility. 4—Torsional Strength. 5—Ability to take Shock Loads under Tension. 6—Resistance to Shock Loads under Shear. 7—Hardness. In addition, there is a rigid inspection of these essentials: 8—Head Diameter. 9—Head Height. 10—Concentricity of Head to Body. 11—Socket Shape. 12—Socket Size. 13—Socket Depth. 14—Centricity of Socket. 15—Class 3 Fit Threads. 16—Clean Starting Threads.

In this way Parker-Kalon maintains a new higher standard of quality in Socket Screws... a standard that satisfies critical buyers. Send for free samples... see for yourself.

PARKER-KALON CORP., 206 Varick St., New York.



PARKER-KALON Cold-forged **SOCKET SCREWS**

Obituary

W. C. WICKERSHAM, Purchasing Agent of the Belridge Oil Co., died at his home in Alhambra, Calif., July 14th.

A. E. WRIGHT, 48, Purchasing Agent for the Bowen Products Corp., Detroit, died in that city July 15th.

GLEN T. PURDY, 48, purchasing Agent for the Midland Steel Products Co., Detroit, died in that city July 26th.

E. A. SHORT, 56, Purchasing Agent for the West Texas Utilities Co., died at his home in Abilene, Texas, July 31st, after a long illness.

PERCY J. SEAMANS, 49, formerly purchasing agent of the Electric-Craft Corp., died at his home in Syracuse, N. Y., August 1st, after a four years' illness.

WILLIAM H. JONES, 76, who served for 34 years as purchasing agent of the Battle Creek (Mich.) Food Co., up to the time of his retirement from active business three years ago, died at his home in that city, August 16th, after an extended illness.

CHARLES W. JAITE, 29, Purchasing Agent of the Jaite Co., Cleveland, died suddenly at his home in that city, August 23rd.

Standardize on AMERCUT



...and get Better Parts from the Same Machine

AMERCUT Cold Finished Steel Bars produce parts that are accurate in size and have a smooth, shining finish. The cold drawing operation employed in the manufacture of these bars improves the physical properties of the steel . . . an extra quality factor that is carried into the products you make. The uniform structure in cold finished steel bars which carry the AMERCUT tag assures easy machining, resulting in reduced tool costs and more accurate parts.

When you standardize on AMERCUT

Cold Finished Steel Bars you can be sure of getting bars that meet your requirements in every specification.

We are equipped to supply you with any type or grade you need and in the shape or finish you require. Rounds are available from stocks on hand in any size from 1/32" in diameter up to and including 6". Our Sales Department or service engineers will be glad to give you complete information on special sizes and shapes. Send for our catalogue containing important charts, tables, etc.

AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago



and New York

Columbia Steel Company, San Francisco, Pacific Coast Distributors

United States Steel Products Company, New York, Export Distributors

UNITED STATES STEEL

Among the Associations

Canadian Convention

The Fifteenth Annual Convention and Inform-a-Show of the Canadian Purchasing Agents Associations, held under the auspices of the Canadian Council, will be held at Hamilton, Ontario, September 22 and 23. The business

program will deal with Canadian and world-wide economic conditions and trends affecting commodity prices, production and supplies. Officers of the N. A. P. A. will be present to participate in the proceedings. Plant visits, golf, and entertainment round out a well-balanced pro-

gram. A special schedule of entertainment for the ladies features the "Royal Tour" of the Niagara Peninsula.

C. C. Callowhill of the American Can Co., is General Convention Chairman, assisted by the following committeemen: *Program*, A. C. Kay of Firestone Tire & Rubber Co. of Canada, Ltd.; *Inform-a-Show*, G. W. Harper of The Wallace Barnes Co., Ltd., and R. Cousins of the G. W. Robinson Co., Ltd.; *Purchasing*, A. S. Coombs of Toronto, Hamilton & Buffalo Railway Co.; *Finance*, G. R. MacMillan of Hamilton Bridge Co., Ltd.; *Publicity*, R. Cousins of The G. W. Robinson Co., Ltd.; *Registration*, O. D. Southwick of National Steel Car Corp., Ltd., R. W. Cross of Hamilton Foundry Co., W. H. Furneaux of Aerovox (Canada) Ltd., and J. N. Peden of Gurney Scale Co., Ltd.; *Luncheons and Banquet*, C. R. McNeil of Fuller Brush Co., Ltd.; *Entertainment*, J. R. Coombe of Tuckett Tobacco Co., Ltd.; *Transportation*, W. R. Waugh of Appleford Paper Products Ltd.; *Golf*, W. B. Anstey of Frankel Brothers, Ltd., and W. P. Acheson of Burlington Steel Co., Ltd.; *Ladies Reception and Entertainment*, G. A. Ireland of National Paper Goods Ltd., and C. R. Brown of Canadian Drawn Steel Co., Ltd.; *Dancing*, F. L. Appleford of Consolidated Sales Book and Wax Paper Co., Ltd.; *Reception*, D. A. Wilson of Canadian Westinghouse Co., Ltd., T. H. Ainlay of B. F. Goodrich Rubber Co. of Canada, Ltd., J. G. Broderick of Otis-Fensom Elevator Co., Ltd., J. G. Davies of N. Slater Co., Ltd., T. G. Elliott of Babcock-Wilcox & Goldie-McCulloch, Ltd., and J. G. Sexton of McKinnon Columbus Chain Ltd.; *Auditor*, P. A. Walker of Canadian Westinghouse Co., Ltd.

. remember that
BRUNT builds
better BOXES

WHEN YOU HAVE A PACKAGE PROBLEM BRUNT
ORIGINAL DESIGNS PERFORM WHERE STANDARD
TYPES FAIL

*Watch this space for
Distinctive Packages*

ANCHOR FOLDER

The inner
folder which
holds contents
is protected
from corner
blows because
it is anchored
in the center
of outer
folder.



The ANCHOR FOLDER is ideal for the shipment of Etchings, Pictures, Mirrors, etc.

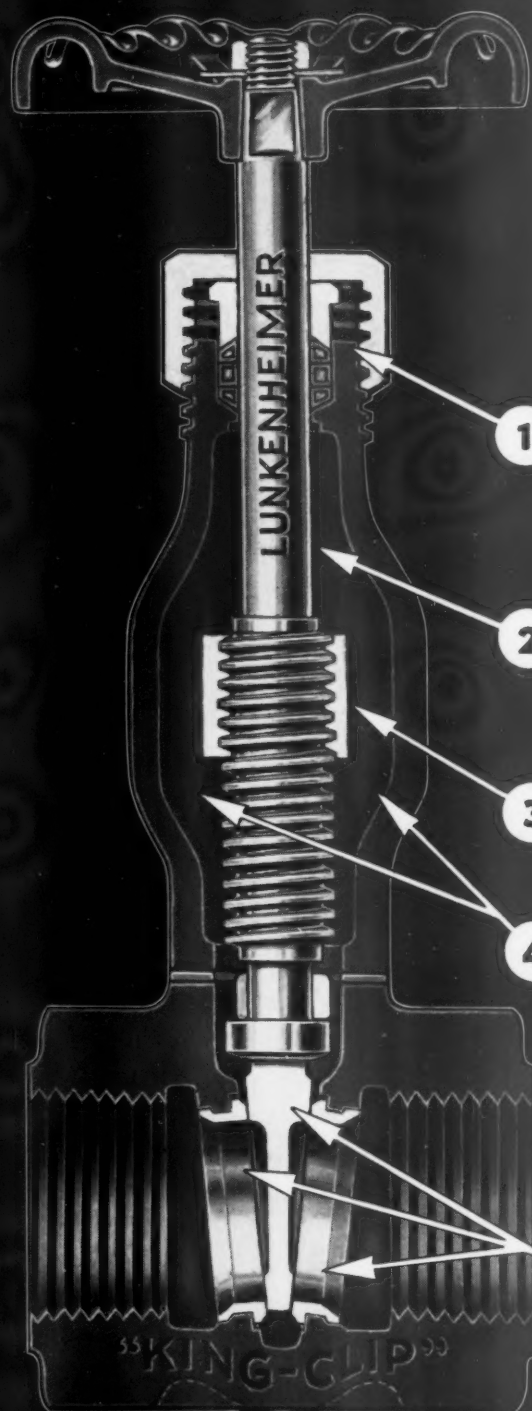
BRUNT & COMPANY
CORRUGATED FIBRE BOXES
CORRUGATED PAPER PRODUCTS

6935 W. 65th STREET

CHICAGO, ILLINOIS



THE ORIGINAL clip type valve with drain channels and bronze bonnet-thread-bushing



LUNKENHEIMER Fig. 1640 "KING-CLIP"

(The King of Clip Valves)

Stuffing Box

Extra strong construction—
hexagon head gland.

Bronze Stem

Perfectly aligned—repacking
seat above stem threads.

Bronze Bonnet Bushing—

Cast in. Non-corrodible
contact for stem.

Drain Channels

Large and unobstructed—ample
size to drain bonnet. Will not clog.

Bronze Disc and Rolled in Bronze Seat Rings

Bronze to bronze contacts
prevent corrosion.

Fig. 1640

CARRIED IN STOCK BY LUNKENHEIMER DISTRIBUTORS

ESTABLISHED 1862
THE LUNKENHEIMER CO.
"QUALITY"
CINCINNATI, OHIO, U. S. A.
NEW YORK CHICAGO
BOSTON PHILADELPHIA
EXPORT DEPT. 318-322 HUDSON ST., NEW YORK

AUGUST 4

PORTLAND — Luncheon meeting of the OREGON ASSOCIATION, at the Mallory Hotel. Speaker: W. C. Ruegnitz, "The Effect of Labor Laws on Prices."

AUGUST 10

SEATTLE — Annual golf tournament and dinner of the WASHINGTON ASSOCIATION, at the Sand Point Golf & Country Club. J. C. Bower was chairman of the committee.

AUGUST 12

LOS ANGELES—Annual picnic of the LOS ANGELES ASSOCIATION, at the Vermont Canyon Theatre Picnic Grounds. Baseball and general sports program. Ralph Porter was general chairman of the committee, Lee Bushard assistant chairman, and Wayne Abel in charge of sports.

AUGUST 15

LOUISVILLE — Outing and dinner meeting of the LOUIS-

VILLE ASSOCIATION, at the New Albany Country Club, in honor of the past presidents, all but two of whom were present at the meeting. Each past officer recalled the most successful meeting held during his term. Committee chairmen have been appointed as follows for the "Instruct-a-Show" to be held October 18-20 at the Armory: *Managing Director*, Robert L. Schmitt; *Fun Fest*, Fred Pfeiffer, Jr.; *Hotels*, J. J. Beirne; *Publicity*, T. A. Corcoran; *Booths*, Malcolm Mason; *Finance*, J. T. Kimberger; *Reception*, Louis Hartman; *Tickets*, Henry Gutman; *Education*, S. T. Hull; *Door*, Lloyd Greenbaum.

AUGUST 18

CLEVELAND—Supper dance of the EAST END GROUP, CLEVELAND ASSOCIATION, at the Acacia Country Club. Gil Winship was chairman of the committee.

PORTLAND — Luncheon meeting of the OREGON ASSOCIATION, at the Mallory Hotel. Speaker: E. H. Cummings, "Personal Observations of a Traveler in the Orient."

AUGUST 24

SAN FRANCISCO — Dinner meeting of the NORTHERN CALIFORNIA ASSOCIATION, at the Elks Club. Annual reports, and installation of the new officers.

AUGUST 25

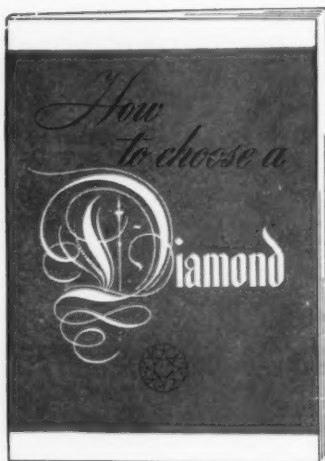
PORTLAND — Luncheon meeting of the OREGON ASSOCIATION, at the Public Market. Speaker: Frederick G. Leasure, Director of Vocational Education, Portland Public Schools, "Vocational Education."

AUGUST 25-26

CLEVELAND — Week-end cruise of the CLEVELAND ASSOCIATION, by steamer to Detroit, where the program included

DIAMONDS FOR SELECTION

We are always pleased to submit diamonds and Diamond Jewelry for inspection without obligation. Whenever you are interested in diamonds write to us.



SEND FOR THIS FREE BOOKLET

Everyone planning the purchase of a diamond will find this booklet full of interest. It gives a great deal of important information which will guide in choosing a diamond. Copies will be sent on request.

L. & C. MAYERS CO.

ESTABLISHED 27 YEARS

IMPORTERS • MANUFACTURERS • DISTRIBUTORS

545 FIFTH AVENUE, NEW YORK

170 BROADWAY, NEW YORK

ALSO PHILADELPHIA • BUFFALO • ALBANY • HARTFORD



**"WE'VE LICKED
THAT SHAFT JOB"**

... Quoted from a certain foreman who had been getting 30 holes per tap on a Diesel engine crankshaft job—when the tap didn't break in the hole and completely ruin the whole crankshaft.

The job was licked because an alert purchasing agent took it up with a G. T. D. Greenfield Engineer who recommended a precision ground tap with six flutes instead of four and a special chamfer and hook for hand tapping. Result: 62 holes per tap, and after resharpening the tap was as good as new.

105% increase is important on any job. The facilities and experience that licked this one are licking other tough ones, every day in the year. Call in a G. T. D. Greenfield Engineer when you have a tough one.

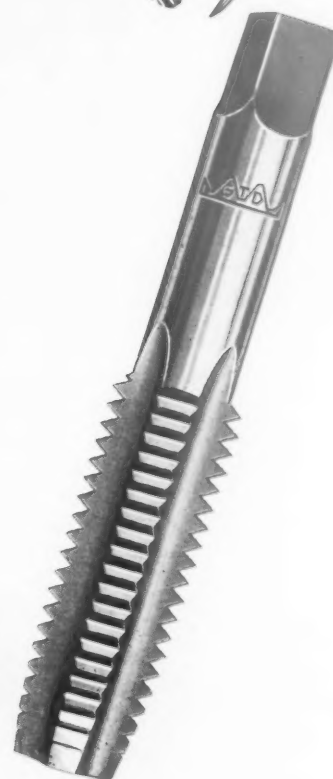
Greenfield Tap & Die Corporation, Greenfield, Mass.

Detroit Plant: 2102 West Fort St.

Warehouses in New York, Chicago, Los Angeles and San Francisco

In Canada: Greenfield Tap & Die Corp. of Canada, Ltd., Galt, Ontario.

GREENFIELD





A GOOD BOLT

with a good name

is a real help to All Supply Houses

CLARK BROS BOLT CO.
MILDALE, CONN.

Has Been Making Them
for 85 Years

Write today for our new catalog listing a complete line of bolt, nut and screw products.



DAYTON GRINDING WHEELS

Regardless of your requirements, you can obtain a Dayton abrasive wheel of the exact specifications the work demands. On the market for years and the preference for a wide range of operations. Write

The
Simonds-Worden-White Co.
Dayton, Ohio
FACTORIES AT: Dayton, Cleveland,
Beloit, Buffalo

A B MURRAY CO INC

NEW YORK'S OLDEST BOILER SUPPLY HOUSE

STEEL AND BOILER TUBES

165 WOLCOTT STREET
BROOKLYN, NEW YORK



ESTABLISHED 1845

an all-day tour of Henry Ford's historical Greenfield Village at Dearborn.

AUGUST 29

OAKLAND—First fall luncheon meeting of the EAST BAY GROUP, NORTHERN CALIFORNIA ASSOCIATION, at the Lake Merritt Hotel.

AUGUST 31

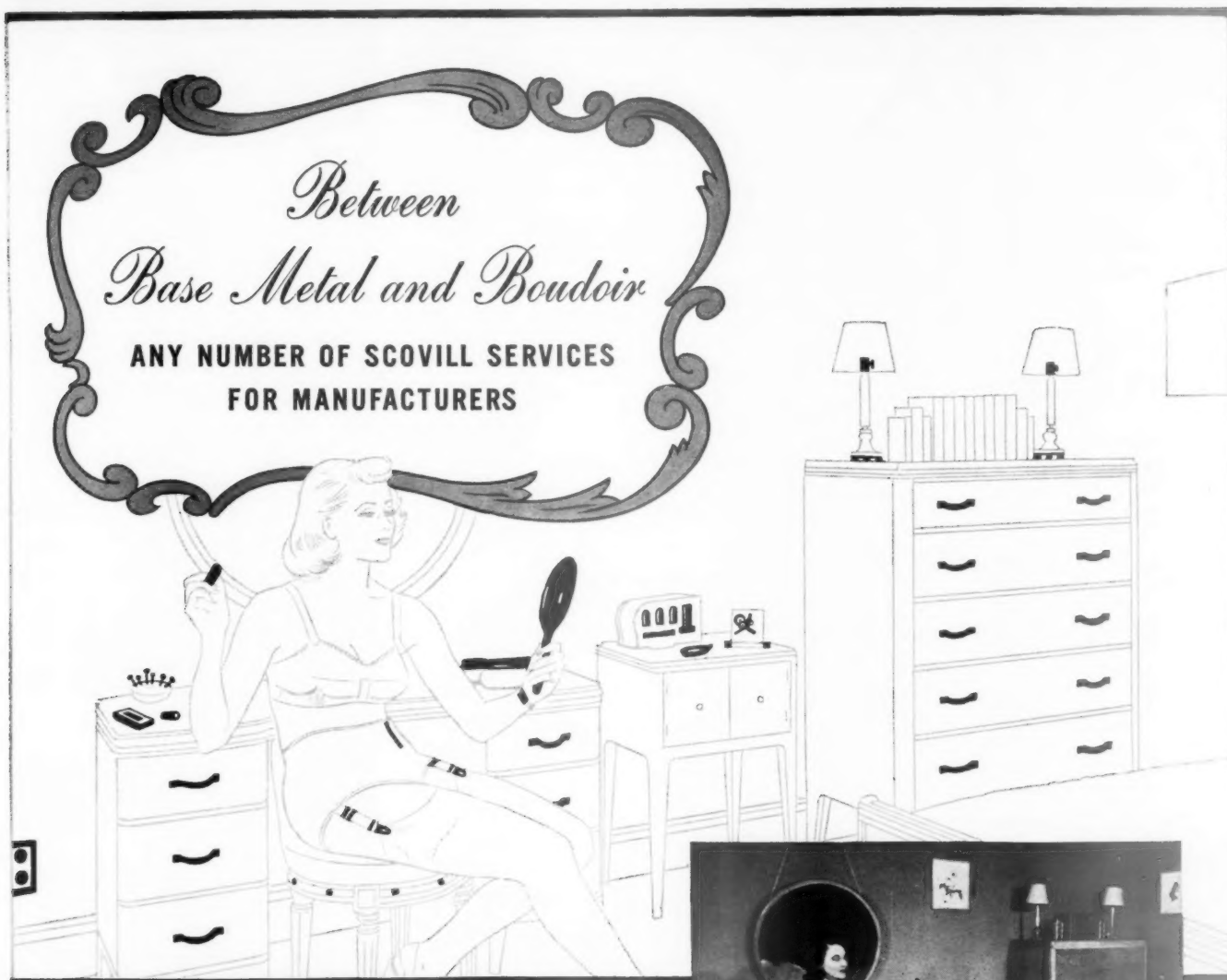
SAN FRANCISCO—Luncheon meeting of the NORTHERN CALIFORNIA ASSOCIATION, at the Palace Hotel. Speaker: E. W. Bullard, President of the E. D. Bullard Co., "Safety in Industry."

Toronto Offers Course in Purchasing

Jointly sponsored by the Purchasing Agents' Association of Toronto and by the University of

Toronto, University Extension, a lecture course in purchasing topics is announced, commencing on Thursday evening, October 12th, and continuing for ten weeks. Registration is not restricted, but is open to everyone interested in the purchasing function. The course has been planned to appeal particularly to the interests of junior buyers and purchasing department assistants. The Toronto Association has added the incentive of two cash prizes for class members submitting the best papers on the subjects: (1) Practical and Constructive Suggestions for the Improvement of the Class in Industrial Purchasing; (2) The Most Informative Lecture in the Series from the Student's Standpoint. The schedule of lectures is as follows:

October 12. "The Efficient Purchasing Department," by



*Between
Base Metal and Boudoir*

**ANY NUMBER OF SCOVILL SERVICES
FOR MANUFACTURERS**

Did you know that Scovill makes containers for the majority of famous cosmetic manufacturers . . . that parts of that clock were Scovill manufactured . . . that Scovill supplies the world with common pins . . . makes snap fasteners . . . ferrules for atomizers . . . a dozen more items pictured above?

Or, for that matter, metal parts for electrical equipment, tire valves, diving helmets, rod, wire, tubing and sheet in brass, bronze or nickel silver . . . together hundreds of thousands of products or parts made from brass, steel, aluminum, copper and other base metals?

The Scovill trademark appears on few items which reach the ultimate consumer. Most often Scovill acts as a contract manufacturer, furnishing metal or metal parts which the buyer finds less practical to make himself.

Metal and Metal Parts — in Quantity

When you need parts forged, turned or stamped . . . or screw machine products from the very smallest up to



those from 2 3/8 diameter rod . . . or assemblies of metal parts . . . or plumbers' brass goods . . . or condenser tubes — get the benefit of Scovill's long experience in serving American industry. Its designers, engineers, tremendous variety of high-production machinery — may offer you advantages in cost, time or sales appeal that are seldom available elsewhere. Many leading manufacturers rely on Scovill in this way.

Meanwhile, read the fascinating account of Scovill's enterprise in many industries related to metal. Address 42 Mill Street, Waterbury, Connecticut for a free copy of "Masters of Metal".



SCOVILL

**MANUFACTURING COMPANY
WATERBURY, CONNECTICUT**

Boston, Providence, New York, Philadelphia, Syracuse, Pittsburgh, Detroit, Chicago, Cincinnati, San Francisco, Los Angeles. IN CANADA: 334 King St., East, Toronto, Ontario.

APEX POWER BITS

for Phillips
Screws



for Slotted
Screws



APEX Power Bits for Phillips and Slotted Head screws are made of special shock-resisting steel with maximum hardness, toughness and wear resistance — to fit all makes of electric, air and spiral drivers.

APEX Hand Drivers are also available for Phillips Screws only: the General Purpose type for ordinary usage — the Super Service type for case-hardened and self-tapping screws.

APEX Bits make for safer driving at higher speeds with less tool cost.

Reconditioning Service

Don't overlook this money-saver: APEX-Phillips Bits can be reconditioned as many as eight or ten times at a substantial saving.

Immediate Delivery

Immediate shipment is made on receipt of order for standard Bits and Hand Drivers.

Write for Apex Manual No. 11

Phillips License No. 2
Patents Nos. 2046837-38-40

The APEX MACHINE & TOOL Co.
Dayton, Ohio

Bernard H. Yardley, Purchasing Agent, The Stanley Works of Canada, Ltd.

October 19. "Law as Applied to Purchasing," by Prof. F. C. Auld, University of Toronto.

October 26. "Psychology — Personal Contacts," by Rupert R. Buchanan, Vocational Consultant.

November 2. "Electricity as Applied to Industry," by Prof. A. Zimmer, University of Toronto.

November 9. "Anticipating Price Trends," by Julian G. Davies, Treasurer and Purchasing Agent, N. Slater Co., Ltd.

November 16. "Coal."

November 23. "Paper — Its Manufacture and Some Uses," by Prof. T. L. Crossley, University of Toronto.

November 30. "Converting Waste Materials into Dollars," by H. T. Spang, Purchasing Agent, Frankel Bros., Ltd.

December 7. "Diesel Engines," by Prof. E. A. Allcut, University of Toronto.

December 14. "Determining Quality in Paint," by H. M. Chamberlain, Lowe Bros. Co.

Syracuse Exhibit

The fifth annual Industrial Products Exhibit sponsored by the Syracuse & Central New York Association will be held at the Hotel Onondaga, September 27th to 29th, with 75 attractive and diversified booths on display. The show will open with a dinner meeting on Wednesday evening for members and their executive associates.

The committee in charge consists of Merton E. Jennings of Selflock Screw Products, *General Chairman*; C. J. Kuckhoff of Syracuse Stamping Co., *Vice Chairman*; A. D. Hanley of Bliss Steel Products, *Registration*; Ches. King of Easy Washing Machine Corp., *Attendance and Acquaintance*; L. A. Saunders of New Process Gear Corp., *Program*; and F. J. Quinn, *Publicity*.

Lost!

because of inefficiency.

Isn't efficiency in the shipping room as important as in your production department?

THE NEW POST-O-METER

- eliminates waste in postage
- speeds up weighing operations
- saves time and money
- and is absolutely fool-proof

Just place a package on the platform—press the key—there's only one figure—the correct postage.

Also may be used for ordinary weighings up to 70 pounds.

Local representative will leave a Post-O-Meter on approval—no obligation.

Write today.

"PRESS
A
BUTTON"

There's
the
Postage
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rate

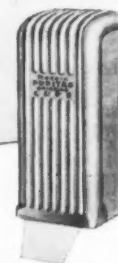


DETECTO-GRAM SCALES

1 Main Street, Brooklyn, New York.

Specify... PURITAN

when you need PAPER CUPS



ALSO PURITAN
ROUND CUPS AND DISPENSERS

THE AMERICAN PAPER GOODS CO.
CHICAGO ILL. KENSINGTON CONN.

Cost-cutting power driving on assembly line was

"IMPOSSIBLE WITH SLOTTED SCREWS

... SIMPLE WITH AMERICAN PLUS PHILLIPS"

*Letter from T. B. FUNK, President
Yard-Man, Inc. to AMERICAN SCREW CO.*

"American PLUS Phillips Screws have been standard equipment on the Silent Yard-Man for four years," says Mr. Funk. WHY? "Every type of screw on the market was thoroughly investigated before we adopted the Phillips, for these screws had to be assembled with power drivers on the slowly moving assembly line — a feat impossible with slotted screws, but very simple, indeed, with American PLUS Phillips."

"American PLUS Phillips Screws have been a real boon to us," adds Mr. F. R. Morris, Vice President of the same company.

ASSEMBLY SAVINGS PLUS PREVENTION

OF REFINISHING COSTS

American PLUS Phillips Screw heads are strong ... so it's safe to use power drivers and drive screws "home." The driver can't slip out of the recess. The close fit of driver and recess prevents burrs.

The screw clings to the driver. So it's possible to start and drive with one hand, using the other to steady the work.

No wonder manufacturers in wood-working, electrical, transportation, machinery, and many other industries are saying



IT COSTS LESS TO USE AMERICAN PLUS PHILLIPS SCREWS

For greatest driving ease, the angles of the tapered recess were carefully worked out to utilize the driver's maximum turning power. Two sizes of Phillips Drivers give greatest driving efficiency with screws in diameters from #5 to #16 inclusive. Four drivers cover the entire range of screw sizes. American PLUS Phillips Screws are cold forged to tolerances of plus or minus .001" — are inspected by a special method of individual handling.

SEND TODAY FOR FACTS ON HOW YOU CAN SAVE

Why don't you find out, today, what *your* firm could save? Use the coupon below, for free information or a sample box of driver and screws.

AMERICAN PLUS SCREWS

with the patented PHILLIPS recessed head

Copyright 1939 by

American Screw Co.

U. S. Patents on Product and Methods Nos. 2,046,343;
2,046,837, 2,046,839; 2,046,840; 2,082,085;

Chicago Office and warehouse: 219 W. Randolph St.
Reading Screw Company, Norristown, Pa.
(division of American Screw Co.)

2,084,078; 2,084,079; 2,090,338. Other domestic and
Foreign Patents Allowed and Pending.

Detroit Office & Warehouse: 1847 W. Bethune St.
Pacific Coast Representative: Osgood & Howell,
Los Angeles, Seattle, San Francisco

IT COSTS LESS TO USE AMERICAN PLUS PHILLIPS SCREWS

AMERICAN SCREW COMPANY • PROVIDENCE, RHODE ISLAND

AMERICAN SCREW COMPANY,
Providence, Rhode Island

☐ Send special bulletin on.....
industry.

☐ Please send sample kit of American PLUS
Screws and driver. \$1.00 to cover cost of pack-
aging and postage is enclosed.

Name.....

Company.....

Address.....

Distributor.....

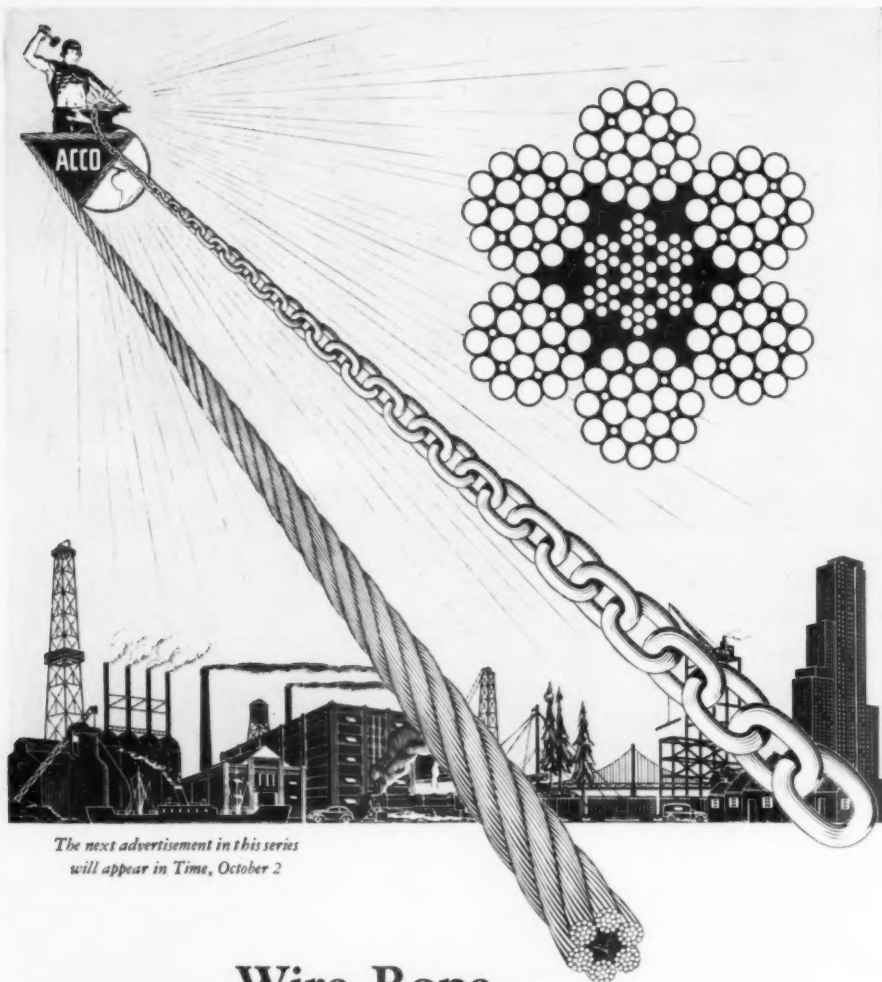
Complete stocks of American PLUS Screws
and Drivers are in the hands of distributors
everywhere. Ask your distributor.

Slotted Head and Phillips Recessed Head WOOD SCREWS

MACHINE SCREWS

SHEET METAL SCREWS

STOVE BOLTS and a complete line of allied fastening devices



The next advertisement in this series
will appear in Time, October 2

Wire Rope— the Sinews of Industry

The cross-section view above illustrates only one of many different constructions made necessary by the many different applications for wire rope. Not only do constructions vary, but also the grade of steel used, and whether the strands are preformed or non-preformed. Each rope has its place in industry—these strong, flexible sinews which keep machines running, whether they be power shovels, elevators, drilling equipment, hoists, or whatnot.

"TRU-LAY" is the trade name for the original preformed wire rope pioneered during 1924 by the American Cable Division of this organization. Since then more than 95 per cent of all wire rope users who tried TRU-LAY Preformed on our recommendation have re-ordered.

Good as TRU-LAY Preformed Wire Rope proved itself to be, it is typical of the other 137 ACCO Quality Products made for Industry throughout the world by the people who are "in business for your safety."

See our exhibit in the Metals (Products) Building,
Opposite the Perisphere and Trylon, New York World's Fair

AMERICAN CHAIN & CABLE COMPANY, Inc.

BRIDGEPORT • CONNECTICUT



AMERICAN CHAIN DIVISION • AMERICAN CABLE DIVISION • ANDREW C. CAMPBELL DIVISION • FORD CHAIN BLOCK DIVISION • HAZARD WIRE ROPE DIVISION • HIGHLAND IRON AND STEEL DIVISION • MANLEY MANUFACTURING DIVISION • OWEN SILENT SPRING COMPANY, INC. • PAGE STEEL AND WIRE DIVISION • READING-PRATT & CADY DIVISION • READING STEEL CASTING DIVISION • WRIGHT MANUFACTURING DIVISION • IN CANADA: DOMINION CHAIN COMPANY, LTD. • IN ENGLAND: BRITISH WIRE PRODUCTS, LTD. • THE PARSONS CHAIN COMPANY, LTD. *In Business for Your Safety*

Baltimore Exhibit

The fourth annual Manufacturers' Products Exhibit sponsored by the Purchasing Agents Association of Baltimore will be held at the Lord Baltimore Hotel on October 24th, 25th and 26th. The exhibit will have about 100 booths, and is practically a sell-out even at this date. There will be awards for the most informative and the most decorative booths, the judging committee comprising an engineer, an accountant and an advertising man. As in previous years, an Exhibitors' Breakfast Meeting is planned for the second morning, October 25th, featuring a prominent speaker.

The following committee chairmen are handling the arrangements for the show:

General Chairman, Frank Carter of The Maryland Dry Dock Company.

Vice Chairman, J. Herbert Gaston, City Purchasing Agent.

Booth Reservations, C. B. Sherman of the New Amsterdam Casualty Company.

Attendance, J. L. Childs of Burns Bottling Works.

Traffic, Morton S. Busick of the Lord Baltimore Hotel, C. C. Copenhaver of Eastern Rolling Mill Company, and G. M. Neukam of Pen Mar Company, Inc.

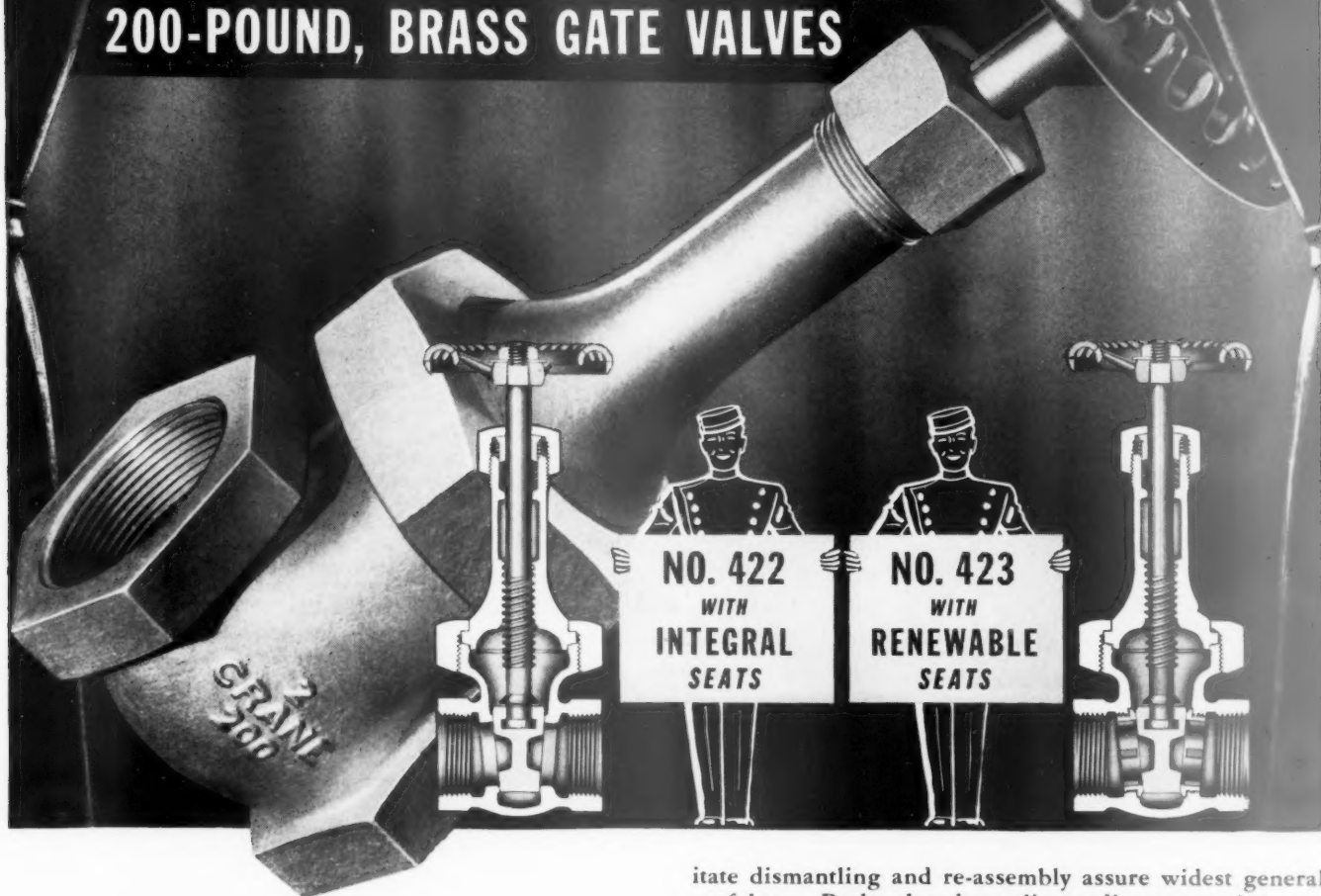
Breakfast, H. E. Olsen of the American Oil Company, and A. H. Schultz, Jr., of Revere Copper & Brass, Inc.

Association Booth, H. J. Holland of the American Ice Company.

JAMES STEELE has resigned as purchasing agent of Mount Holyoke College, South Hadley, Mass., to become purchasing agent for the United Illuminating Company of New Haven, Conn.

BASIL J. CREAGER has been appointed purchasing agent of the Hotel Sinton, Cincinnati, succeeding MARCUS G. HEIMAN, resigned.

CRANE PRESENTS: The "UTILITY TWINS" STARRING THE NEW, NOS. 422 and 423 200-POUND, BRASS GATE VALVES



TWO new star performers join valvedom to serve you—the Nos. 422 and 423 Crane Brass, Solid Wedge, Gate Valves.

We call these valves the "Utility Twins" and that's what they are—ideal for all-around, hard service on 200-pound steam, water, oil, or gas lines. The No. 423 is made with renewable seats and disc of Crane Nickel Alloy—a metal that's matched to the needs of really tough jobs of flow control. The 422 has integral seats and a Nickel Alloy Disc. Both valves, proved in laboratory and field tests, are worthy of any piping system.

There's added utility in the twin-like design of the 422 and 423. Interchangeability of operating parts will show a saving in the need of spares. Advanced features that facil-

itate dismantling and re-assembly assure widest general usefulness. Both valves have slip-on disc connection.

But most important to you is that the 422 and 423 are Crane-Quality—all the way through. Just like all Crane valves, they are products of sound design . . . expert engineering . . . able craftsmanship—backed by elaborate research and manufacturing experience of over 84 years. To you, Crane-Quality in valves gives strongest assurance of dependable flow control at minimum cost.

GET COMPLETE INFORMATION IN BULLETIN 311

It will pay you to look into these new Crane valves. Bulletin No. 311 gives you all the interesting facts, sizes, prices. Ask your Crane Representative for a copy or mail the coupon below. Keep this folder handy—with your Crane No. 52 Catalog showing more than 38,000 valves, fittings, and piping items for every need.

CRANE

CRANE CO., GENERAL OFFICES: 836 S. MICHIGAN AVE., CHICAGO

VALVES • FITTINGS • PIPE • PLUMBING • HEATING • PUMPS

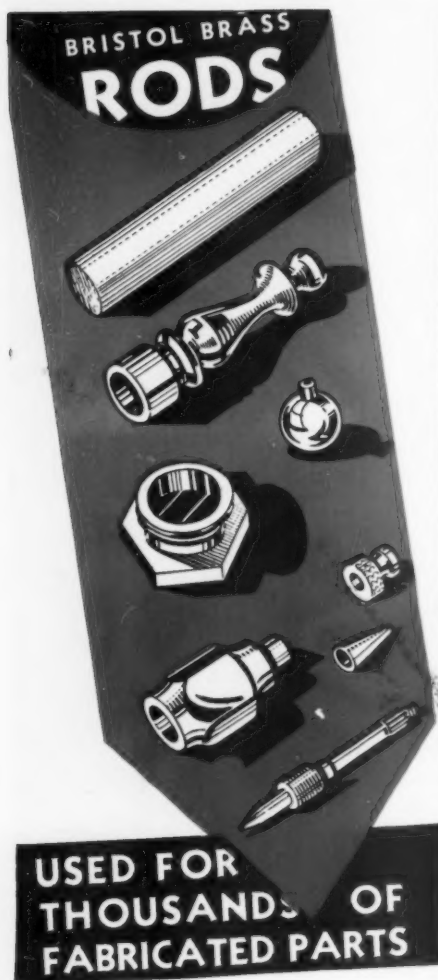
NATION-WIDE SERVICE THROUGH BRANCHES AND WHOLESALERS IN ALL MARKETS

CRANE CO., 836 So. Michigan Ave., Chicago, Ill. PUR-9-39
Gentlemen: I want a copy of Bulletin No. 311 on the new Crane 200-pound brass gate valves. No obligation, of course.

Name.....

Address.....

City.....State.....



Tell us your FABRICATING PROBLEMS. We will gladly send samples and suggestions without obligation. *We do not fabricate above parts ourselves.*

ROUND, SQUARE or HEXAGON rods available in all sizes from 1/16 to 3 1/2 inches.

UNIFORM TEMPER assures smooth grain and finish which greatly prolongs die and tool life.

FREE-CUTTING BRISTOL ROD increases production . . . edges and faces are held sharp and true . . . finished product is clean and bright.

SPECIAL BRISTOL ROD is made for full knurling, free turning and swaging, also for welding, repairing and forging.

THE BRISTOL BRASS CORP.



BRISTOL, CONN.
Brass and Copper Alloys
SHEET · ROD · WIRE
Established 1850

Purchasing Course at New York

The New York Business Institute, a division of the New York Y. M. C. A. Schools, announces a course in Purchasing—Principles and Practice, commencing September 18th and meeting twice a week for thirty-two sessions. The instructor is Henry Meyer, General Purchasing Agent of the General Bronze Corporation, a Past President of the Purchasing Agents Association of New York.

The prospectus lists the following topics to be covered: Development of the purchasing function; qualifications and responsibilities of the purchasing agent; the requisition; sources of supply; organization of purchasing department; the request for quotations; negotiations with bidders; the purchase order; follow-up of delivery; the handling of invoices; cash and trade discounts; standardization and preparation of specifications; legal aspects of purchasing; market studies and price trends; taking the inventory; purchasing for large and small corporations; handling of scrap and salvage materials; purchase records; purchasing department reports; buying in relation to the business cycle.

Among specific problems to be discussed are: Locating the purchasing department; Where real buying begins; Exposing a selling "racket"; Centralizing purchases for decentralized production; When purchases meet costs; Shall the order be confirmed?; What is a fair adjustment?; What says the law?; Buying for future requirements; Changing the standard of equipment; Buying for big business; Buying for small corporations; Scrap iron buying; Is it cheaper to buy from hand to mouth?

Supplementing the lectures and discussion, motion pictures will be shown to illustrate basic manufacturing processes, such as the production of steel, paper, rubber, lubricating oils, copper, etc.



Blue Star Planet Sealing Tape is tremendously strong because only husky No. 1 Kraft is used. Pioneering in the field 30 years ago, McLaurin-Jones worked hand and glove with paper manufacturers to develop a kraft exactly suited to take gumming. No. 1 Kraft is the good result.

For gumming, only pure animal glue is used—no dextrine or loading. This gumming has a quick catch and grips like a vise. Our slitters are equipped with gages that always assure you of honest measure—600 feet to every roll of 60-pound stock. The 600-foot rolls come in the following widths: 1 1/2", 2", 2 1/2", 3", 4".

Some of the biggest shippers from coast to coast find Blue Star PLANET Sealing Tape the sturdiest and safest. On the toughest, bumpiest rides . . . with even greater manhandling than shipments it seals are likely to get in transit, PLANET grips hard . . . sticks like a leech . . . does the perfect sealing job! Printed with trade-mark, design, or type—to your order. Try it . . . ask your paper merchant or write for free sample coil. From then on you'll specify "PLANET" Blue Star Sealing Tape!

★
OTHER PRODUCTS in the McLaurin-Jones line, of interest to purchasing agents include: McLaurin-Jones Guaranteed Flat Gummed Papers; Ware Metallic Casein Coated Papers; Ware Metallic Pyroxylin Coated Papers; Ware Foils; Ideal Gummed Veneer Tapes; Ideal Gummed Hollands . . . and a variety of allied items. Ask your paper merchant or write us for details.



MCLAURIN-JONES CO.
BROOKFIELD, MASSACHUSETTS

Mills at Brookfield and Ware
Offices at New York · Chicago · Los Angeles

MCLAURIN-JONES PRODUCES A FAMOUS LINE OF PAPER SPECIALTIES FOR VIRTUALLY EVERY PURPOSE

Buyer's Bookshelf

INDUSTRIAL MARKET DATA HANDBOOK, prepared as a cooperative study by the U. S. Bureau of Foreign and Domestic Commerce, the Census Bureau, and the Bureau of Mines. This handbook, the first of its kind to be published, contains complete figures on industrial production, employment, value of products, cost of material, fuel and power, and output per wage earner, for each of the 3,070 counties in the United States, and similar data for every city of more than 10,000 population. The figures are those of 1935, the latest year for which information in this form is available.

Included in the handbook is a tabulation of the county locations of 169,111 manufacturing plants, classified by kinds of industry. Operation summaries showing the number of firms engaged, cost of material, fuel and power, value of products and number of wage earners on a national basis for each of the 280 industries covered. Parallel tables covering the mining industry, with a county location table for each of the 23,000 mines, by type of mine, are also included.

The publication further contains information dealing with channels of distribution and manufacturing operation costs, as well as a key table on wholesale operation in a number of the heavy industries. It affords a comprehensive assembly of statistical data dealing with the size and location of American industrial markets, especially useful in establishing new sales territories or appraising old ones, for setting up sales and production quotas, planning sales and advertising campaigns, and selecting channels of distribution likely to be most profitable to the manufacturer.

Published by the Superintendent of Documents, Washington, D. C., and identified as Domestic Commerce Series No. 107. Price, \$2.50.

PURCHASING FOR SMALL CITIES, by Russell Forbes, Commissioner of Purchase, City of New York, and members of the staff of Public Administration Service. This practical pamphlet has been prepared as a guide to the application of sound business principles to the procurement of supplies, materials, equipment and contractual services for a small municipality. The outline is simple, in keeping with the relatively small budgets under discussion, but it is pointed out that such practices have demonstrated the possibility of savings up to 15%,

with added efficiency of service—a factor just as important to the average small municipality as in the case of larger governmental units. The eight basic elements or objectives are summarized as (1) centralization of authority over purchases; (2) employment of competent purchasing personnel; (3) development of standards and specifications to assure the quality of goods purchased; (4) consolidation of departmental requirements into quantity purchases in order to obtain more favorable prices; (5) stimulation of active competition among bidders;

(6) inspection and testing of goods delivered to enforce compliance with specifications and terms of orders; (7) control over goods in storage; (8) control over salvage.

The text is in three sections. The first deals with the establishment of a centralized purchasing system, starting with the centralization of authority, then taking up personnel, facilities and records required for operation, and suggestions for the development of standards and specifications, and cooperative purchasing. The second section outlines a typical procedure, starting with the requirement and requisition, and tracing the process through negotiation, ordering, receipt, inspection and testing of goods, ap-

LOOK FOR The **RED TANG**

— the mark of the files with
teeth shaped like those of a
metal cutting saw. They
cut faster, with less
effort — you CUT in-
stead of scrape.

Ask Your
Supply Dealer



SIMONDS SAW & STEEL CO., Fitchburg, Mass.

ARMSTRONG

Chrome - Vanadium Socket Wrenches

**Detachable
but RIGID !**

**Only
ARMSTRONG
has the
Drivelock**



ARMSTRONG Socket Wrenches offer all of the advantages of quick assembly; drivers, handles, extensions, ratchets—the full range of sizes and in addition *rigidity*.

With the patented Drivelock ARMSTRONG has brought socket wrenches up to industrial standards of strength and safety. A quarter turn of the lock pin locks socket to driver, driver to ratchet, extension to extension. Build up a tool of any length—each unit locks securely to the others. Regardless of size or shape this "1-piece" assembly will not pull, pry or knock apart.

Chrome-Vanadium Sockets 5/32 in. to 5 in.—all types. Drop Forged Ratchets, handles, extensions and sets for all purposes.

Write for Catalog

ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

303 N. Francisco Ave. CHICAGO, U.S.A.

Eastern Warehouse Sales, 199 Lafayette St., N. Y.
San Francisco London

proval of invoices, and control of stock and salvage. The third section presents a suggested provision for a charter or state statute on municipal purchasing, and a suggested ordinance establishing the purchasing system, so that the department may operate on a sound legal basis.

There are a number of illustrations, showing key forms for the conduct of the department, a typical specification for municipal use, and a flow chart showing the procedure as it operates in respect to the using agency, the purchasing agent, the finance office, and the vendor.

22 pages, paper bound. Published by Public Administration Service, 1313 East 60th Street, Chicago. Price, 50 cents.

THE EVOLUTION OF THE CLASSICAL WAGE THEORY, by Michael T. Wermel, Department of Economics, Brooklyn College. This is a critical and historical picture of the gradual evolution of the theory of wages, rather than an appraisal of its validity. It is a thorough study, undertaken in the belief that the content of a theory can be better comprehended when its origin and evolution have been carefully examined, noting the slow and almost imperceptible changes which have taken place with new conditions and the passage of time, as economists, politicians and statesmen have sought to clarify it and apply it to current conditions, and as it has evolved under the impact of diverse opinions and constructions. It is particularly significant in view of the socialist critique of the capitalistic order.

190 pages. Published by the Columbia University Press, 2960 Broadway, New York. Price \$2.25.

Nelson is Promoted

RICHARD M. NELSON, who has been associated with the purchasing department of the Chesapeake & Ohio Railway since 1912, and has served as purchasing agent for the past seventeen years, has been appointed general purchasing agent of the C & O System, with jurisdiction over the Chesapeake & Ohio, the Nickel Plate, and the Pere Marquette Railways. Mr. Nelson is a veteran in rail-roading, and will complete 49 years of service with the company next month.

Lower MARKING COSTS
with CUNNINGHAM
LETTERS and FIGURES

WEDGE GRIP DESIGN

STANDARD DESIGN

**More Impressions
NO MUSHROOMING
NO SPALLING**

Manufactured from the toughest commercially-made tool steel in the world. Write for literature.

M. E. CUNNINGHAM COMPANY
154 East Carson Street - - Pittsburgh, Pa.

SPRING SLIDE RULE

Free on Request

- TO PURCHASING AGENTS
- AND
- TO ENGINEERS

Enables anyone responsible for design or purchase of springs to figure rapidly and accurately the variables in compression or extension springs, and so determine for himself just how a new spring should be made to meet requirements.

Also to check existing springs and see how improvement could be made or savings effected.

Computes torsional stresses in pounds per square inch for any load on all commonly used combinations of dimensions. Also indicates loads a spring can handle and deflection under varying combinations of wire size, coil diameter, number of coils, etc. Gives other necessary data. Saves time—prevents mistakes—saves money. Its use is easily learned—brief Instruction Booklet sent with the Rule.

THE
WILLIAM D. GIBSON CO.
1800 Clybourn Avenue • Chicago, Illinois

(Division of Associated Spring Corporation)

GIBSON-SPRINGS

*Use this Handy
Request Form*

Gentlemen:

Please send Spring Slide Rule and Instruction Booklet (no charge) to

MR.

FIRM

ADDRESS

CITY

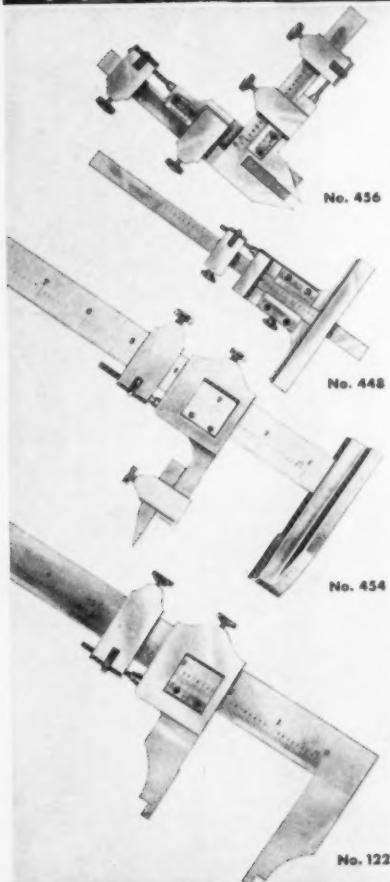
STATE

NPCHG



for accuracy *plus*

STARRETT VERNIERS



The accuracy of Starrett Vernier Height Gages, Depth Gages, Calipers, Gear Tooth Calipers, Dovetail Calipers and similar vernier tools goes without question. But along with unfailing accuracy, Starrett Verniers give you the perfection of design and finish that is essential with precision tools of this type . . . which is why you'll find that Starrett Verniers are standard equipment in the best shops wherever you go. For a description of the complete line of Starrett Precision Tools, Dial Indicators and Hacksaws, see Starrett Catalog No. 26 P. A copy free on request.

THE L. S. STARRETT CO.

World's Greatest Toolmakers
Manufacturers of Hacksaws Unexcelled
Steel Tapes, Standard for Accuracy
Dial Indicators for Every Requirement
ATHOL, MASS., U. S. A.

Smythe Appointed

ROBERT W. SMYTHE has been appointed City Purchasing Agent at Honolulu, Hawaii, by Mayor Charles S. Crane. The new buyer is a native of Kilauea, and has held several important business positions in Hawaii, including work for the Maui Agricultural Company, besides having six years of experience as a manufacturers' agent on his own account. During the World War he attained the rank of first lieutenant.

Shall We Do this Construction Work?

(Continued from page 28)

It is also quite obvious that in order to make a comparison of plant construction costs and estimated contractors' costs, the figures must be on a similar basis. One firm, for whom the writer did a great deal of work, actually distributed their plant overhead on the basis of the dollar value of the stores issued to various departments. During the construction period, when most of the material was for construction, the latter was carrying the bulk of the plant overhead. Yet the management insisted on comparing the unit construction costs with



Only WIREGRIP Belt Hooks

have the patented blue Aligning Card that holds hooks in position, prevents them from loosening, prevents hook loss from handling, prevents waste of short ends. Every WIREGRIP Hook to the last one can be used.

Flexible BELT LACING

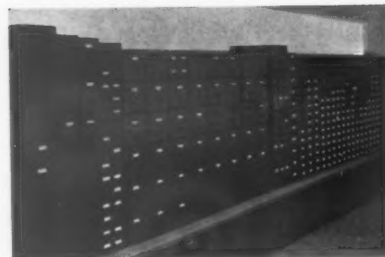
STEELGRIP is a stronger lacing for all power and conveyor belts. Clinches smoothly into belt, compresses ends, prevents fraying, 2-piece hinged rocker pins prevent excessive wear. In boxes or long lengths.

Write for Catalog

Armstrong-Bray
& Co.

"The Belt Lacing
People"

321 N. Loomis St.
Chicago, U. S. A.



You MUST Keep Payroll Records

Social Security and Wage-Hour laws make it compulsory to keep time clock cards, payroll checks and other employment records. If these important records aren't accessible and in a safe place you need SAFE-T-STACK Steel Storage Files.

SAFE-T-STACK files are tailor-made to fit their contents. They are made of heavy, welded steel. They cost less than cardboard boxes and shelving. Tell us what you have to store. We are counsellors in record storage problems.

THE STEEL STORAGE FILE CO.

2216-18 W. 63rd St.
Cleveland, O.



TRADE MARK

ALUMINUM OXIDE
SILICON CARBIDE
CORUNDUM
(AFRICAN)
TURKISH EMERY

Refiners and Makers
of
ABRASIVE GRAINS
AND
FLOURS

AMERICAN ABRASIVE COMPANY
WESTFIELD, MASS.



We ring the bell again.
What saving! What efficiency!
What improvement in
Duplicating work!

The PROCESSED NEGATIVE HECTOGRAPH Master

not only saves you
THREE COSTS — on
 Printed Forms, Spoil-
 age, and Errors — it
 also **CUTS READING**
TIME by giving you
 contrasty 2nd COLOR
FILL-IN!

*It speeds up all
 work dependent on
 internal shop forms,
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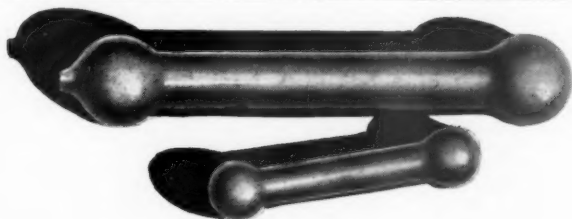


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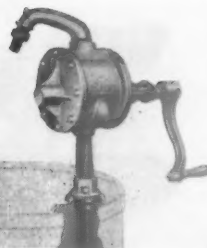
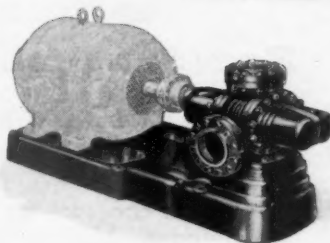
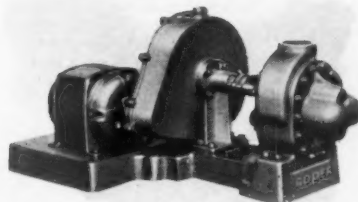
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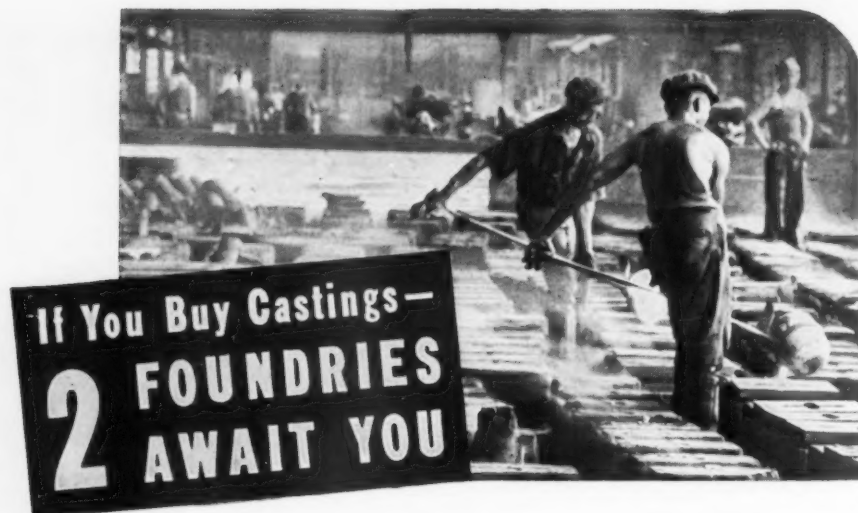
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those of an outside contractor, who charged 95% of his overhead as direct labor on the job. This made it possible for him to sell his services on the basis that they must be efficient, as they had practically no overhead. The plant management could not dispute this claim, for their own figures were a hodge-podge of both operating and construction summaries.

Whether a plant should do any, or all, of its construction is not always a matter of simple economies. There are cases, such as a very complex mechanical installation which requires the use of men trained for this special work, men who are not readily available outside the plant. There are cases where the work is dangerous for all except those familiar with the hazards, such as high pressure chemical industries. There are cases where seasonal peaks on production are followed by slumps which will permit plant forces to be retained on construction. There are cases in large plants where the maintenance force is of necessity so large that a slight addition to it, under proper leadership, can take care of

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a definite volume of added work. And again, there are industries large enough to warrant maintaining their own construction forces, moving them about from plant to plant as the occasion warrants. There are cases when immediate needs demand instant action in order to maintain the production.

Irrespective of any of these, the ultimate idea is to make a profit at the end of the year, and the first thing for management to do when considering the matter of performing construction with their own forces is to get the facts in dollars and cents as far as they can be established.

A worth while suggestion, out of the experience of years, is that if one is not organized to do the work at a price which will save the contractor's profit, they had better turn the work over to a trained construction organization in whom they have confidence and let them do the worrying. For, as a matter of fact, if all the truth is told, it is difficult to beat a competent organization at their own game.

More and more it is becoming appreciated that real cooperation between the client and the contractor lends itself to speed, economy, and satisfaction with the work performed. Selection of a competent and trustworthy contractor, using one of the recognized types of service contracts, may furnish the possibility for legitimate cost reduction with all the flexibility of performing the work with plant forces.

What's Wrong with Government Purchasing?

(Continued from page 38)

for a governmental buyer supersedes the political qualification, I believe it will be practicable to allow the governmental buyer just as much latitude in the determination of ultimate values and will be possible to hold him to the same degree of personal accountability for a good job of buying.

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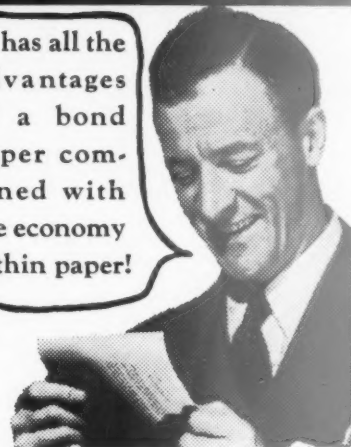
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A prominent governmental purchasing agent states that the crux of the problem is to provide for a real civil service qualification for the governmental buyer. He says further, "I have found that many public purchasing agents are political appointees and as long as these appointments are made generally in this manner, it would be dangerous to let down the bars because even now through the connivance of politicians, much purchasing is done on the basis of favoritism and other insidious influences. It is so important that the purchasing official be properly selected and be properly protected against political pressure that I would not recommend a change in the present red tape system without being first assured that the position would not be used for political fence building."

I believe it would be wise to remove some of the literalism and rigidity and much of the stilted formal language that now surround some of our government buying which often is offered in excuse of poor choices and delays. Third rate purchasing can and does hide behind regulations and red tape. Strong purchasing demands qualified administration, unhampered and accountable only for adequate results.

Truck Sizes and Weights

(Continued from page 32)

and Texas. These are the only states using the pay-load limitation for privately-owned trucks. Capacity may be doubled in Texas, on vehicles operated short of, or to the nearest common-carrier station. Louisiana discarded such a common-carrier restriction last year, and its maximum allowable loads may now be carried regardless of destination.

Mountain States Go In For Height

Five of the eight Mountain states permit vehicle heights of 13 ft. 6 in. or more. Montana

this year reduced its former 14 ft. 6 in. by one foot, and also made gross weights subject to a bridge formula. Under this the gross is slightly increased when the spacing between first and last axles is more than 20 ft.

Long Combinations Along the Pacific

Tractor semi-trailers may be 60 ft. overall or bumper-to-bumper length in Washington and California. But the intervening state, Oregon, sets up a 45-ft. limit for such combinations. The lowest height allowance (11 ft.) of any state is found in Oregon, although permits may be secured for heights up to 12 ft. 6 in. on certain highways with no low overhead obstructions.

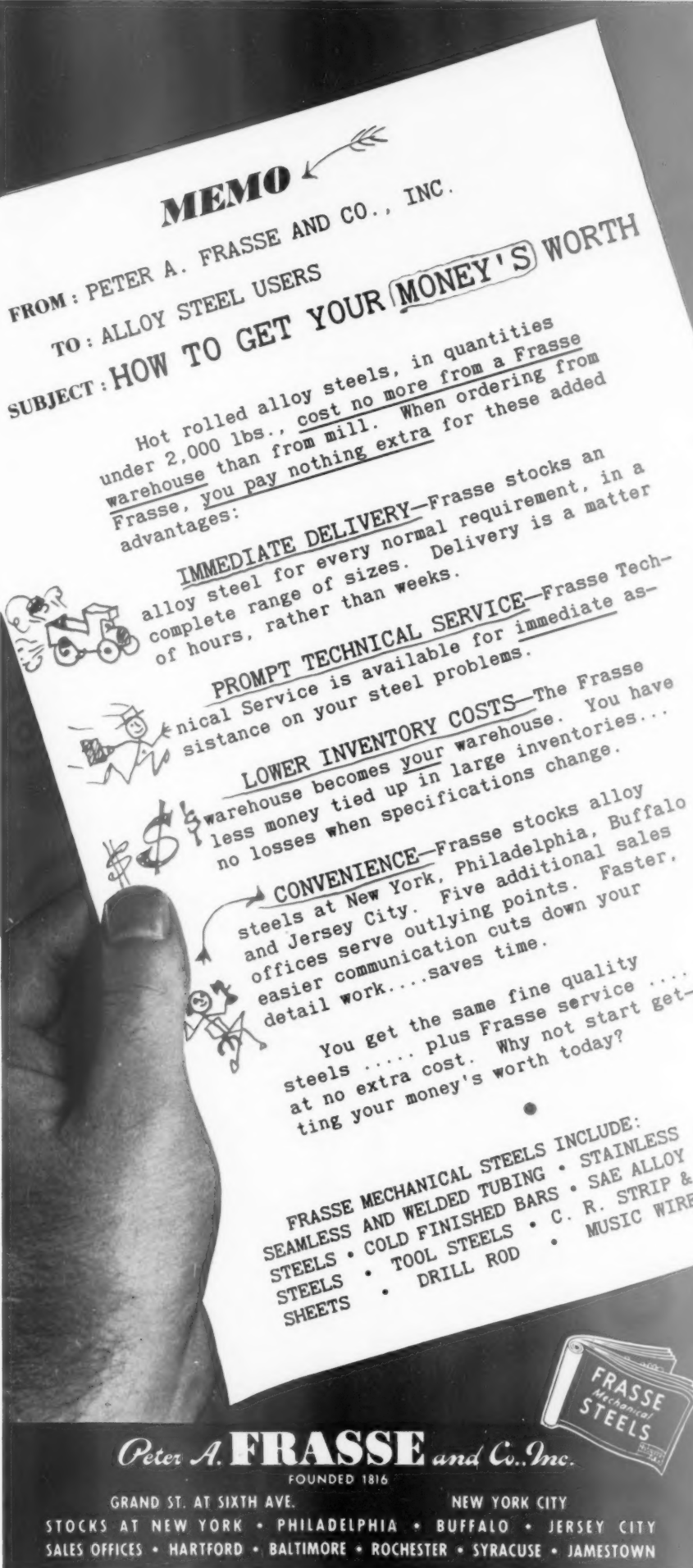
As a matter of fact the highway departments in most of the states are authorized to issue permits for the operation of over-size and over-weight vehicles. These permits may cover a single trip, a specified period, or be limited to designated highways. Usually the permit must be carried on the vehicle. In a number of states a bond may be required. State or local authorities may also reduce weight limits, in most cases on particular highways or during special seasons. These variations in size and weight limits are summarized in the National Highway Users Conference booklet, "State Restrictions on Motor Vehicle Sizes and Weights," from which the data tabulated in this article have been abstracted, with the approval and cooperation of the Conference.

Benedict Van Voorhis

(Continued from page 41)

purpose. He cajoled, reasoned, argued, educated, and on occasion fought for the idea, and eventually won his point.

The experience, which embodies in a single personal example the general history and development of centralized purchasing in industry, has deepened his conviction and his belief in pur-



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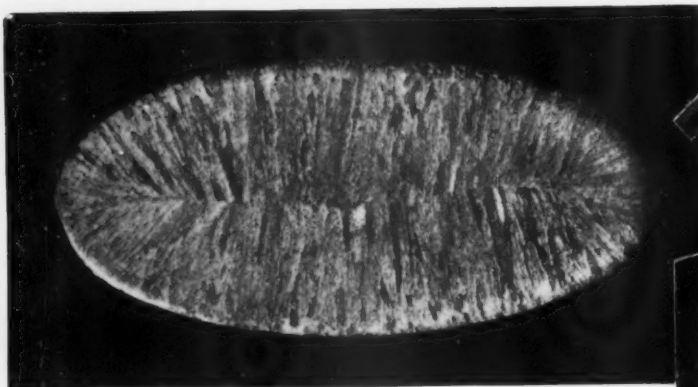
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chasing to a more than ordinary extent. He would not wish to put every young buyer through the same hard experience, but believes that if some of the newcomers who step into a ready-made purchasing organization today, could have shared in a small part of that struggle, they would have a better conception of the dignity, importance and possibilities of the job. He is just as earnest about it now as ever, and finds buying an enormously interesting career. He likes its variety, its contacts, and its opportunities for service and for growth.

Progress was easier when the Dupont Company began to acquire an interest in the concern in 1925, and the progressive management policies of that large organization began to make themselves felt. The change of ownership was completed in 1929, and when the plastics operations were consolidated in that year, he was transferred to Arlington, N. J., in charge of the combined purchasing. He still gets up to the Leominster plant about twice a month. Under the present arrangement, since 1933, he holds the title of Division Purchasing Agent of the plastics department, and Purchasing Agent of the Celastic Company, reporting directly to the general purchasing department at Wilmington.

One of the important contributions he has made to departmental policy was the initiation of a general course in purchasing for the benefit of his own colleagues and assistants in the department, which won the commendation of the management and is to be resumed when the turnover in personnel warrants its revival. It is based on the belief that comprehensive training is desirable in purchasing as in other phases of management, and that such training will eliminate much of the trial-and-error element in purchasing work and lead to a more intelligent and effectual approach to buying problems and procedures.

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The same belief has prompted the preparation of several articles on basic principles of purchasing for the benefit of younger men in the field, a task which has not been altogether easy, for Van is thorough rather than fluent in expression. It also led to the establishment of forum-type meetings on specific and practical topics during his term as President of the New York Association, a feature which has steadily gained in popularity because of its genuinely helpful nature.

WHILE he was still at Leominster, he joined the New England Association, and held his membership for about eight years, though his location at a considerable distance from the Boston headquarters made active personal participation impracticable. Upon coming to New Jersey, his membership was transferred to the New York group, and he was soon drafted for committee work and quickly achieved a leading role in association affairs. After serving on the Executive Committee, he was elected to the presidency in 1937-38.

In the National Association, he was made chairman of the Chemical and Allied Products Group at the Pittsburgh convention of 1937 and subsequently reelected to continue in that office. Under his direction, the group has carried on a constructive program and is well established as a vital part of the national work, and the group meetings are a recognized feature of the convention proceedings. At St. Louis in 1938, Van went on the air to broadcast one of the featured reports of the convention.

His first national convention was the Grand Rapids meeting of 1927. Since that time he has missed but few of the meetings, and has a wide acquaintance among purchasing men.

His personal contacts with suppliers are also extensive, and he has made it a point to develop this side of his work. Being somewhat off the beaten track at Ar-



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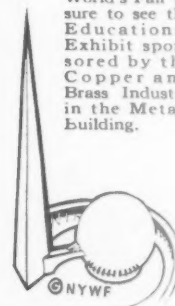
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lington, he has found it highly advantageous to go out and buy rather than wait for sellers to come to him, though his company is one decidedly worth the suppliers' cultivation. One great advantage of this policy is that he selects his own contact in the selling organization and has an exceptional entree for authoritative information and service.

THE Van Voorhis home is in Montclair, N. J. He plays a successful game of bridge, with Mrs. Van as a tournament partner, which is pretty good evidence of a successful partnership in more ways than one. Their two sons, Shepherd and Lee, attend Montclair High School.

Van also plays a little golf, and gets away to Cape Cod each summer to enjoy the ocean swimming. He is an extensive reader, chiefly of current periodicals. While the boys were in scout work, he became a member of the local Boy Scout Council and has a lasting interest in that type of community work.

His long record of service with one industrial organization seems to belie the frequent and drastic changes that characterized his early career. In the perspective of the years, however, it indicates a flexibility and a faculty of adjustment to circumstances without losing sight of the ultimate purpose. Van has seen his industry go through a formative period of development that has completely changed its character, not once but many times, and with technical developments coming to fruition with each succeeding year to revolutionize the process, the product, and the fields of application, that long service has shown no sign of degenerating into a rut of static routine. One of the most stable things about it has been his own adaptability and steadfastness of purpose as he has kept pace with the development and change. It's an excellent trait for buying in this world of economic uncertainty.

—S.F.H.

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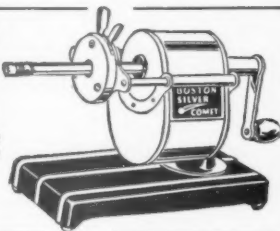
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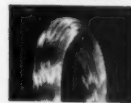
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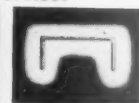


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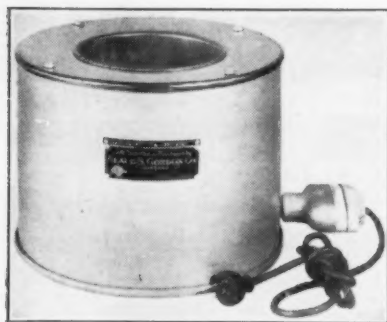
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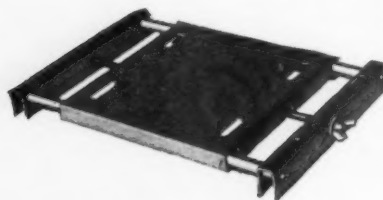


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THIS new portable electric furnace heats salt baths electrically for tempering and drawing. Measuring 12" in outside diameter by 10" in depth, it takes a salt bath pot measuring 6 $\frac{3}{8}$ " in diameter by 5 $\frac{5}{8}$ " in depth. Approximate weight is 25 lbs. With a current input of 900 watts, the furnace can be specified for operation on 110 or 220 watts. It is available alone or supplied with a thermometer and rheostat for operation at temperatures to 1,000 degrees F. Made of seamless-drawn corrosion-resisting metal, the pot is lock sealed to the top flange of the furnace to provide for pot expansion without permitting salt to seep down into the heating-element location. Pot, heating element, and top flange can be replaced as a single unit, the housing and other parts being saved.

Use coupon below



MOTOR BASE

No. A78

AUTOMATICALLY maintaining proper belt tension through the action of special high grade steel springs, this new motor base is especially suited to short center

PURCHASING

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Name

Company

Address

City State.....

PAGE 86

drives, and is applicable to all types of loads—pulsating, steady, or reversing—and to horizontal, vertical, or overhead drives. A turn of the adjusting screw takes up the slack from normal wear and stretch, while spring tension holds the motor, takes up slack and cushions load shocks that might otherwise damage the motor and bearings. Installation is simple, as the complete motor is bolted down as a unit on the sliding plate of the base. To change belts, spring tension is released and the new belt is placed around the sheaves.

Use coupon below

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CONVEYOR
BELT**

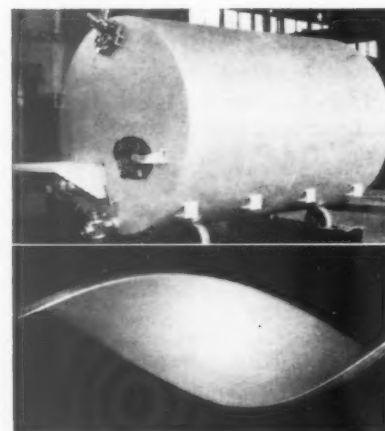


No. A79

PRICMARILY designed for use in confectionery and biscuit plants, this conveyor is applicable with equal advantage in industrial plants where small articles must be conveyed on belts in limited space. It is furnished to provide 45°, 90°, or 180° turns, and will carry articles around these turns right side up, without bunching or crowding. Simple in design and construction, it requires only ordinary attention when once installed, and may be powered either by independent variable speed motor drive or from line shafting.

Use coupon at left

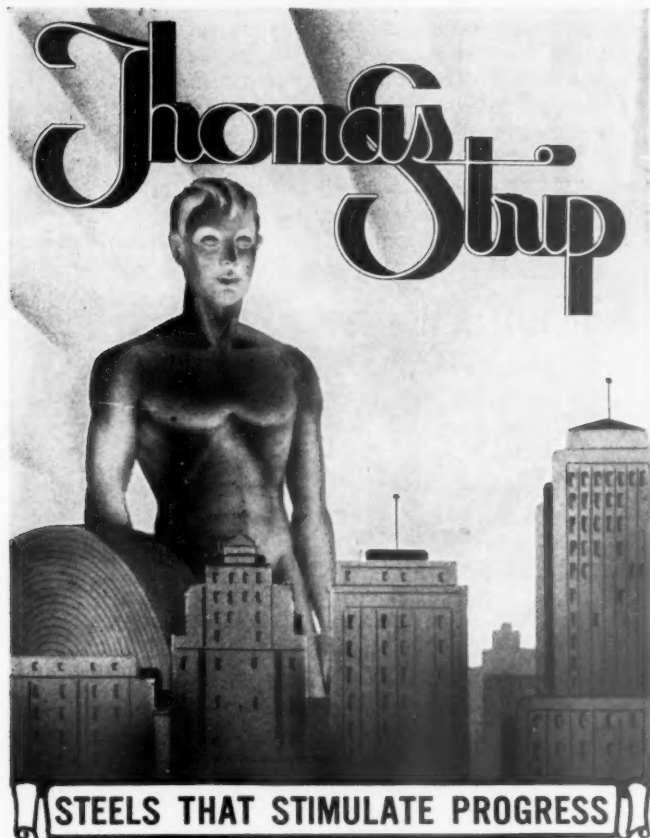
**STAINLESS
CLAD STEEL
SHEETS**



No. A80

SHEETS and plates combining the corrosion resistance of stainless steel and the desirable properties of mild steel, are available in "Silver-Ply," consisting of stainless cladding welded to flange quality mild steel backing. The result is better heat conductivity than solid stainless and superior qualities for bending, spinning, drilling, and deep drawing. The strength of the oxide-free bond is illustrated

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Speeds Production . . Reduces Costs

New inventions, new developments, new economies often demand new and more rigid steel specifications. Requirements of gauge, width, and edge become more exacting. Tempers and physical properties must dovetail more closely with the demands for faster production and more uniformly high quality. Quality of finished products is of increasing importance and above all, costs must be held down as improvements advance.

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Specialized Producers of Cold Rolled Strip Steel



Bright Finish Uncoated, and Electro Coated in
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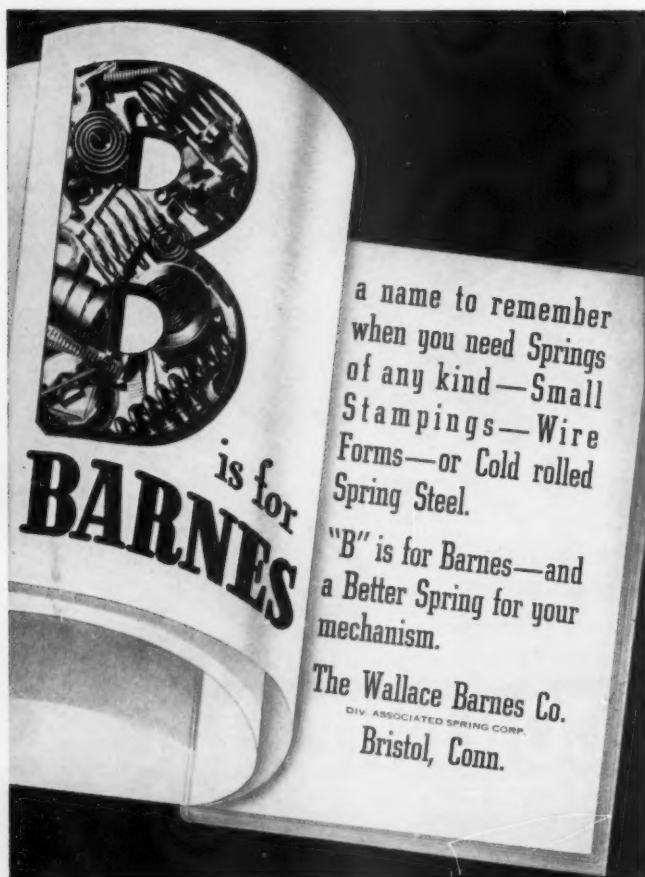
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sewage disposal plants, and vessels for the handling of varnish, chemicals, soaps, oil, gas, textile and paper composite metals. The upper photograph shows a typical vessel fabricated from this material. Suitable for use in cooking vessels, storage tanks, marine equipment, water works, rials, food, pharmaceuticals, etc. The standard sheet consists of 20% stainless steel, but all degrees of cladding from 3% to 50% can be successfully produced.

by the spiral twist without any separation of the com-

Use Coupon Page 86

COPYHOLDER



No. A81

GREATLY increasing convenience and speed in copying on business machines, particularly with continuous form writing machines, this new and inexpensive development offers several unique features. It will hold large numbers of different sized sheets at one time, single sheets can be removed easily and quickly without disturbing the others, and a liner is provided for use if required. The device clamps to the side or back of desk, leaving the desk top clear; floor or wall mounting is also possible. It is completely adjustable, so that the operator can always maintain correct posture and see her copy in the best available light.

Use Coupon Page 86

TYPEWRITER BACKING SHEET No. A82

A USEFUL accessory for the typist is a new backing sheet of special composition material that combines the proper amount of resiliency and resistance so that it offers a perfect support for making clear, sharp originals and bright, legible copies. Furthermore, it prolongs the life of ribbons and carbon papers, furnishes a new surface for worn platens, and modifies revises. A convenient numbered tab aids in correct spacing and signals the approach of the bottom of the sheet, without the necessity of using marginal printed carbons. Also useful for typing hectograph masters and cutting stencils.

Use Coupon Page 86

PORTABLE PNEUMATIC GRINDER



No. A83

WEIGHING only 18 ounces, and 5½ inches in overall length, this new rotary air grinder is easy to handle for the most delicate precision work and has power for continuous service on the hardest jobs. It is characterized by low air consumption, and holds a nearly constant speed under load, with virtually no power waste. It operates at a free speed of 14,000 r.p.m., and is used efficiently with a

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**"WE GET MORE CUTS PER SAW
 With ATKINS BLADES"**



TEETH THAT BITE
ATKINS
Silver Steel
SAWS

CERTIFIED SAWS, SAW TOOLS,
 MACHINE KNIVES, ETC.

● Be sure to measure job performance along with price and size to get at the true cost of items differing as widely in quality as hacksaw blades. The surest way to tell is to send your shop superintendent, say a week's supply of Atkins Blades with instructions to test them on the job with other saws, side by side on the same metal. When he reports how an Atkins makes more cuts per blade . . . stays on the job while time-out is called to replace others . . . easily slices through steel too tough for weaker blades . . . you'll know it's time to standardize on Atkins. You'll buy fewer saws and the shop will turn in lower costs per job, when purchase orders call for Atkins Silver Steel "Blue Ends" (or "Yellow Ends" for "moly") guaranteed to cut more metal than any other blades.



**A CHOICE OF THREE
 OUTSTANDING BLADES**

●
BLUE END HACKSAW BLADES
of Silver Steel

●
YELLOW END HACKSAW BLADES
of Molybdenum

●
New 400-500
SUPER HIGH SPEED BLADES

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Two of the *"Thousand Uses"*
 for the Simplex UTIL-A-TOOL!



Pulling spoked and plate center wheels, gears and pulleys and clamping are only two uses for the Util-A-Tool, truly "the tool of a thousand uses."

Besides these jobs, it lifts (up to 17½ tons), pushes, pulls, bends, spreads and tensions in maintenance, construction and fabricating work. Frequently pays for itself on a single job. Comes complete with attachments in handy carrying case.

Sold by your supply house.

TEMPLETON, KENLY & CO., Chicago, Ill.

Better, Safer Jacks Since 1899

SIMPLEX
 GOLD MEDAL AWARD SAFETY JACKS



WITH PLACES TO GO!

**RED STREAK
 SEALING TAPE**

● Your boxes and packages, sealed with Red Streak Sealing Tape, give the impression of dignified and efficient packaging because no extra tape is needed to insure their being received intact. Red Streak Sealing

Tape offers you dependable sealing with minimum effort . . . your shipping room will like that! It's priced to meet all competitive tapes . . . you'll appreciate that! Write today for a free sample roll and try it in your shipping room. There's no obligation.

The BROWN-BRIDGE MILLS TROY, OHIO

**WRITE FOR
 SAMPLES**

TRY IT . . . then you'll know why Red Streak Sealing Tape is a better sealing tape for all purposes.



ABBOTT BEARING BALLS

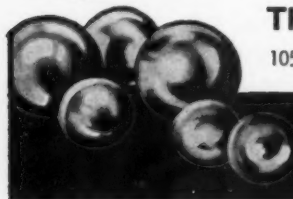


24 HOURS A DAY

Performance that knows no time clock is an old story to Saginaw Stamping & Tool Company conveyors. Saginaw relies on Abbott Bearing Balls to withstand the gruelling service, the rough usage that tests the stamina of overhead trolley conveyors. For heavy, medium, or light duty assemblies, close precision or commercial limits, Abbott supplies the right grade ball to meet performance demands.

The Abbott Ball Company

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variety of accessories—abrasive wheels up to 1½" diameter, rotary files and steel cutters, sanding discs, wire brushes, saw blades, polishing and buffing wheels, etc., making it a highly versatile tool.

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PAIL TIPPER

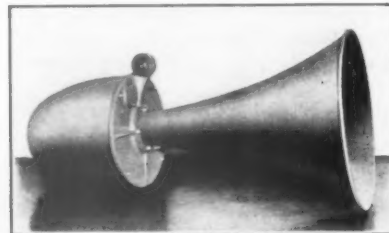


No. A84

THIS new hinged cradle accommodates a standard 5-gallon drum and permits easy tipping for pouring the contents as required. It consists of an angle-iron frame, extended to provide stability in use, and a hinged ring and supporting strap, the latter being extended to form a handle. The center of gravity is such that the drum is normally held in upright position and will return to that position when the handle is released.

Use Coupon Page 86

LOUD SPEAKER



No. A85

THE new "Baby Bull" loudspeaker unit is designed for outdoor use. It consists of a single metallic horn of the exponential type, driven by two dynamic receivers enclosed in a moisture-proof aluminum housing. When used with a 50-watt amplifier it is capable of radiating 17 watts of acoustical energy. Directional characteristics give faithful reproduction through a 30-degree angle. Frequency re-

Unbreakable!

MARVEL High-Speed-Edge Hack Saw Blades

Strictly High-Speed, these patented combination blades are also *positively unbreakable*. They permit greatly increased running speeds, for heavier feed pressures and can be tensioned much tighter than other blades for the hardened "eyes" in their tough alloy steel body will not pull out.

No matter what hack saw equipment you use, you can safely run at full capacity with MARVEL High-Speed-Edge Blades.

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ARMSTRONG - BLUM MFG. CO.

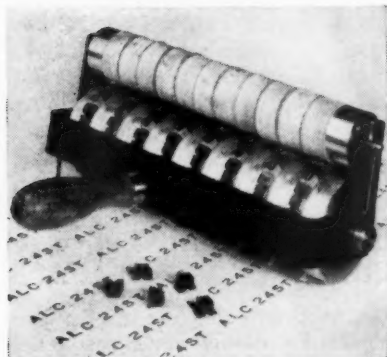
"The Hack Saw People"

5760 Bloomingdale Ave.

CHICAGO, U. S. A.

sponse is practically uniform over a range from 110 to 6,500 cycles. 50 inches in overall length, 25 inches in greatest diameter, weight 65 pounds.

Use Coupon Page 86



MARKING TOOL

No. A86

ROLLER-MOUNTED rubber type is used in this device to mark flat sheets and surfaces. The roll is 12" long and 3" in diameter, either slotted to take No. 35 rubber type of dovetail design, or with plain surface to take a blanket type rubber die. The ink fountain tube is arranged to prevent flow when the tool is not in use, and there is spring pressure control between the felt feed washers and type rolls. A feature of the new equipment is the possibility of using a split ink fountain so that two colors may be printed simultaneously.

Use Coupon Page 86

HECTOGRAPH MASTERS

No. A87

A NEW processed hectograph master, unique and patented, has been developed for use with any spirit duplicating machine. Used for commercial forms which require information filled in on the typewriter in the usual way that spirit hectograph carbon is needed, it can be used as a master form on the spirit duplicator in connection with blank copy paper, producing runs up to 150 copies with perfect registration and eliminating the use of printed forms. Ideal for shop forms, production orders, etc. These processed negative masters are what is known as the ink process and do not require a sheet of hectograph carbon for every master.

Use Coupon Page 86



BENCH SHAPER

No. A88

THIS recently developed bench shaper is fitted with a 1 H.P. combination router-shaper motor, 18,000 r.p.m., which is held under the table in a holder that can be tilted from a vertical position to any angle up to 45°. With the motor tilted to various angles and with three cutters used singly or in combination, it is possible to make over 500 different kinds of cuts. The table top provides a working

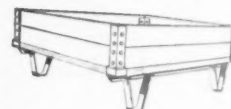
JUST ANY LIFT TRUCK or One for Your Needs?



Barrett builds 16 models of lift trucks—a type and size for every need—in a wide range of capacities. Barretts save in every plant because they lift, haul and turn easier, withstanding rough service abuse and overloading.

There are 19 types of Steepleg Platform skids, of typical Barrett engineering and construction, for use with Barrett Lift Trucks.

Write for Catalog 639 showing the Most Complete Barrett Line of Materials Handling Equipment and Free Trial Offer.



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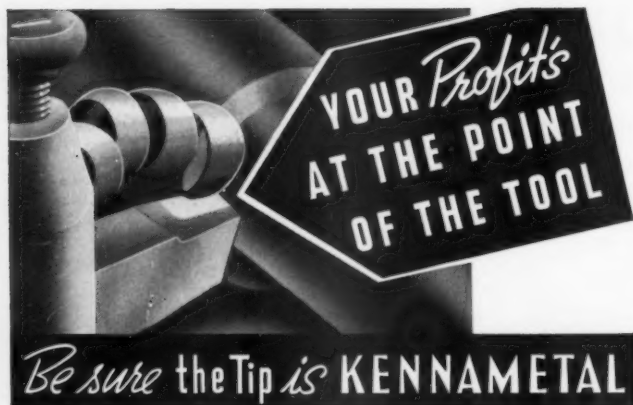


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★ OLD TOWN SABLE is the achievement of three decades ★
Made of finest rag tissue, it is coated by an exclusive Old Town process which gives SABLE carbon paper brilliant life and lustre and amazing sharpness and durability never before attained ★ Non-curling, clean to handle. Write for Samples.





KENNAMETAL-tipped tools will increase profits in your plant by cutting costs in three departments. KENNAMETAL machines steel heat-treated to 550 Brinell (reducing annealing costs), at higher speeds (reducing machining time) and producing a smoother, more accurate finish (reducing grinding and polishing time). In addition, KENNAMETAL permits more pieces per grind of tool, reducing tool investment.

Write today for catalogue of standard and special KENNAMETAL tools and KENNAMETAL blanks.

STANDARD and SPECIAL TOOLS



McKENNA METALS Co.
180 LLOYD AVENUE
LATROBE, PENNSYLVANIA, U.S.A.

surface large enough for practically all shaping work, measuring 16"x26", and is so made that if additional surface is needed wood extensions can be attached. The table top is drilled to accommodate an adjustable straight fence, tension shoe, light fixture and circular guide. The cast iron legs have drilled bolt holes for anchoring the shaper to a bench. A regular switch is on the right front leg and an overload switch is also provided on the front of the table. The same motor can be used in a plain base for routing, grooving, veining, inlay and templet work. An adapter can be used in place of the shaper spindle to take router bits.

Use Coupon Page 86

READY MIXED ALUMINUM PAINT FOR RUSTED WIRE FENCE No. A88

A NEWLY developed aluminum paint, ready mixed, is now available for painting rusted chain-link fence without the necessity of removing the rust. The base oils are of the penetrating type, which creep into all joints and contact points, sealing the rust against further corrosive action. The paint can be applied with brushes or spray gun, and dries from the outside, retaining a firm elasticity which withstands the movement of the joints without chipping. The metal particles are well dispersed, resulting in a brilliant and durable finish.

Use Coupon Page 86

LIGHTING UNIT



No. A89

SUPPLEMENTAL lighting for fine assembly work, inspection, spray booths, paint shops, and exact machine work is provided by this new concentrator unit designed for lighting horizontal and vertical surfaces from an oblique angle. The unit consists of an aluminum reflector, porcelain socket assembly, cast-aluminum socket housing, and swivel-mounting bracket for 1/2-inch conduit mounting. It employs a one-piece reflector with diffuse or specular

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reflecting surface treated by the Alzak process, highly efficient and easily cleaned. Heat-resisting glass lenses, plain or heavy stippled, are held to the reflector by a split ring with self-spreading lug to facilitate lens removal, and fitted with a rubber gasket for vapor-tight and dust-proof seal. The smaller size uses 200-watt bulbs, clear or inside frosted, and the larger unit uses 300 or 500-watt clear lamps.

Use Coupon Page 86



ACOUSTIC PHONE BOOTH

No. A 90

MODERN design and scientific acoustic construction are combined in this new model telephone booth adapted for use in industrial, commercial and public installations, effectively suppressing the noises encountered in mill, factory and power house locations, and assuring the user of privacy as well as practicable and efficient conditions for carrying on a conversation. The construction is of natural plywood, with a perforated pattern that allows the noise to disappear into the sound-suppressing inner wall. This treatment is applied to the ceiling of the booth as well as to the walls, carrying out the principle of actually absorbing the noise instead of merely attempting to block it out with a door. As a result of this method, an open front construction is possible, permitting ventilation and ease of cleaning not found in ordinary booth equipment. The principles of construction and design have been amply tested under actual conditions of use in varied commercial surroundings. It is attractive in appearance, being designed by the noted industrial designer, Alfonso Iannelli, to incorporate the best features of modern functional industrial art. The exterior is of plywood, with walnut finish.

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Nearly 4,000 TYPES of CASTERS and WHEELS by DARNELL

If you want a long life of satisfactory service, maximum floor protection and extra efficiency. Demand Darnell. Darnell Casters and Wheels take severe punishment day in and day out and continue to function efficiently. All wearing parts are carbonized and hardened, assuring maximum service.

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New 192 Page
DARNELL MANUAL



Few Dollars Save Hundreds when invested in Barrett Handling Equipment

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TBT-13

TOTE BOX TRUCK

For fast, safe handling of single or tiered tote boxes. Slight downward pressure on handle lifts load from floor; provides quick, easy movement of filled or empty boxes. All steel construction.



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Strong enough to support any full drum or barrel, yet light in weight for easy carrying, the Barrett Rockerack enables workers to get more done and eliminates hazards. Containers quickly raised to convenient height for draining purposes. Available in 8 styles, all of arc-welded rolled channel steel. Cradle bands nest drum in place.

Get the complete story from Catalog No. 639 and 30 day free trial offer—there are dozens of other cost-cutting material handling equipments made by

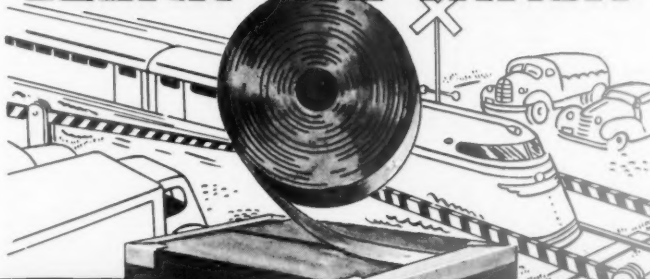


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Don't let inferior sealing tape clog and strangle your shipping room. Make things move with Orange Core—the sturdy, quick-sticking tape that assures smooth and speedy production. You'll find it faster, surer, stronger... and thrifter! Try Orange Core today. Write now for free folder on correct sealing methods.

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SIGNODE *Tensional Steel Strapping*
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F. O. B. (Filosophy of Buying)

MOST corporation reports stress sales volume as the most potent and impressive measure of their operations and progress. Maybe it's just a sign of the times—the increasing recognition of purchasing—but in any case it is refreshing indeed to find the August 30th report of the Westinghouse Electric & Manufacturing Company to its 50,000 stockholders, emphasizing the company's role as a buyer.

There's plenty of interest in an annual purchase budget of over \$100,000,000. The report points out that the biggest item—steel and iron—runs into tonnage sufficient to make 2,290 miles of railroad track, from Chicago to San Francisco; or to make a 1-inch steel rod long enough to encircle the earth two and a quarter times, in case you don't want to get from Chicago to San Francisco.

Smallest purchase of the year, quantitatively speaking, was 10/1,000 of a gram of radium, used in examining welds. Weight for weight, it was also the costliest item. The price was \$300.

What a difference a few hours make! We went away for the Labor Day week-end still thinking in terms of routine demand, conservative commitments, orderly expansion, and relatively stable operations. We came back three days later into the midst of the most frantic commodity markets this old world has seen for many a day, apparent surplus supplies wiped out overnight, many prices rocketing to new levels and others withdrawn. It's a good thing that we buyers are still fortified with that vacation pep. We need it.

AS we go to press, comes the news that the big Machine Tool Show is called off, due to the urgent pressure of business which will keep the exhibitors at home, working in their shops, rather than entertaining prospective customers and explaining the fine points of their wares. It's a real loss for the hundreds of purchasing men who count on this fine exhibit to keep them up to date on what's new in the field. As one result, we forecast a keener than usual interest in the advertising pages of the industrial press, which (though we say it, as shouldn't) continues to serve as the reliable year-round business exhibit.

Perhaps this situation presages a return to the time when salesmen were called into the factories and shipping rooms to help get out the orders, while purchasing men took to the road, camping in suppliers' plants and railroads switchyards, to see that the materials were delivered. Remember?

INTERESTING price quotation, as reported in the New York newspapers of September 1st: 15-cent cigarettes, which have been selling for 17 cents a pack, two for 32 cents, are now offered at 16 cents a pack, two for 31; 10-cent brands, selling at 14 cents a pack, two for 26 cents, are now 13 cents a pack.

A good many purchasing men found a point of particular interest at the New York World's Fair in the graphic exhibit of the Department of Purchase, City of New York, showing the scope and accomplishments of Commissioner Russell Forbes' highly efficient organization. It is to be hoped that the tax-paying constituency likewise got an eyeful. Columbus, Georgia, takes no chances on the transient trade, but brings the story directly to the customers. The city government staged an impressive "Parade of City Services" on August 30th, in which the Purchasing Department had a prominent display, featuring the diversity of its purchases.

SEEMS as though F.O.B. can't get through a month without reporting some newsworthy quirk from the field of governmental buying. The Philadelphia *Record* reports that purchasing officials at the Philadelphia General Hospital were on the spot a couple of weeks ago, and drew the caustic criticism of the August Grand Jury, when 692 pounds of tainted meat were discovered in a hospi-

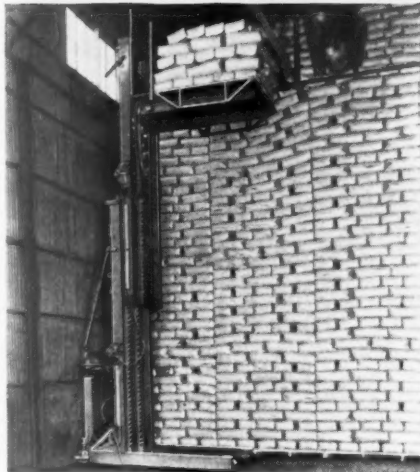
BARNES **BETTER** *Hack Saw* **BLADES**

There's a good Barnes Blade for every cutting job. Ask your supply dealer.

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Barrett Portable Elevators—hand or electric—solve many storage problems. With them you get the most from your floor space by piling boxes, barrels, bags, bales, crates or rolls many tiers high. And they save on plant maintenance work. Models for handling dies and loading trucks from floor level; also stationary inter-floor, turntable and telescoping types.

There's a Barrett Portable Elevator for every requirement of industry. Write for Portable Elevator Catalog showing application in many types of plants.



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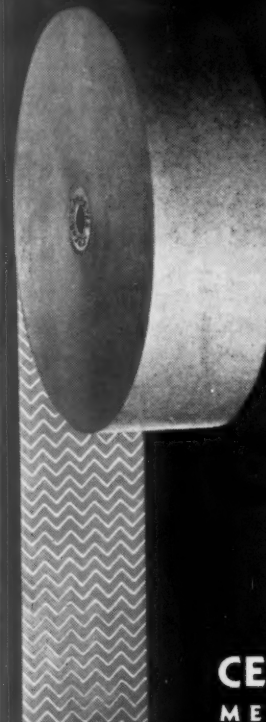
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GUMMED TAPE



Pull-tab opener in every roll.

Processed to make it pliable and non-curling.

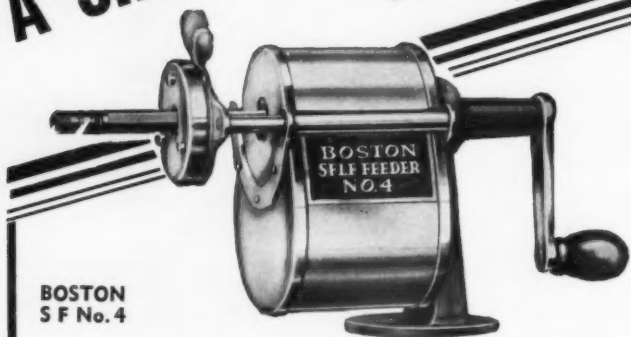
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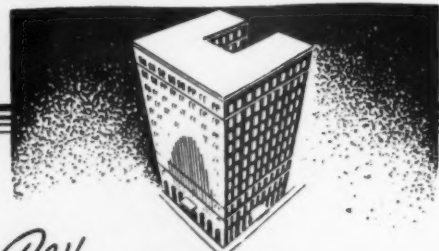
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350 ROOMS FROM \$2. FREE
TUB, SHOWER AND RUNNING ICE WATER PARKING

LOCUST AT EIGHTEENTH

ST. LOUIS
MISSOURI

tal refrigerator. They were subsequently exonerated when Judge Rosen ruled that the spoilage was an "act of God." It seems the whole thing started when a bolt of lightning struck an electric cable and shut off the current for refrigeration.

John Q. Public heartily endorses the President's determination to take the profits out of war. But just as a prudent hedge, John got down to Wall Street early the next morning and climbed aboard some of the war babies, helping to run them up 5 to 17 points in the Street's biggest day in more than two years.

THE economists of the Twentieth Century Fund, in the course of a 400-page report on the tribulations of the distributor, bring forward the proposal of charging different prices for the same article, depending on the conditions of sale—whether a cash or credit transaction, delivered or carried home by the customer, returned or retained. This, in effect, is the application of purchasing science to marketing science, for it represents exactly what competent buyers are constantly trying to establish in their own purchases—the possibility of earning and receiving the benefit of economies in the manner of conducting business. And it is far more logical and equitable than a "customer classification" that is subject to all sorts of abuse.

Such a plan would be a body blow to adherents of rigid uniform prices, who refuse to concede that cost is made up of two factors: the cost of product plus the cost of distribution, both of which are variables. Efficiency in production is recognized as a worthy aim, but efficiency in distribution should be penalized, under their system.



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Catalogs, Stamp Collections, Photos—Albums, Records.
KEEP SHEETS SPOTLESSLY CLEAN

Send for Samples and give name of your Stationer

The Marketing of Copper

(Continued from page 46)

to prefer to buy after the market turns upward, whereas Europeans are inclined to buy constantly on declines.

Direct Sales are the Rule

There are ten concerns listed as "principal sellers of copper in the United States," all having headquarters in New York. Since the list is comparatively short, it is practical to name them: American Metals Co., Ltd., American Smelting & Refining Co., Anaconda Sales Co., Calumet & Hecla Consolidated Copper Co., Copper Range Co., Kennecott Sales Corp., Adolph Lewisohn & Sons, Inc., Magma Copper Sales Corp., Phelps Dodge Corp., and Quincy Mining Co.

The policy of the copper producers has been invariably to sell direct from producer to consumer, avoiding middlemen. They opposed trading in copper futures on the New York Metal Exchange, then on the succeeding National Metal Exchange, and finally, on the Commodity Exchange, Inc., which was a merger of the National Metal Exchange and several exchanges dealing in other commodities.

Despite this opposition, Commodity Exchange sees more and more copper traded, with the record around 9,000 tons in one day. A contract consists of 25 tons, though quotations are in cents per pound, as in the actual or physical market. During 1939, some of the smaller producing companies have quite openly used Commodity Exchange as the outlet for their metal, and hence it would seem that prejudice against trading in copper is breaking down.

Copper is a handy commodity to trade in. It does not spoil, is easy to classify by analysis, is convenient to store, and has quite universal value. The contract traded on Commodity Exchange is the standard contract, but if electrolytic of recognized quality is to be delivered it automatically carries a premium of 65 points over standard. It is claimed that the actual copper in Commodity Exchange official warehouses is of best grade and all that it is supposed to be. This is worth mentioning, for at times it has been said of the London Metal Exchange, doubtless facetiously and with exaggeration, but perhaps with a grain of truth, that some of the copper which has backed paper transactions in that market included all kinds of "cats and dogs" that disguise as merchantable copper, such as brass door knobs, old cartridge shells, and what not.

The selling agencies dealing in the actual or physical copper seldom deal in less than carload lots. For smaller amounts, consumers usually apply to dealers and brokers. Producers quote on a delivered basis, i.e., they pay the freight. It is the

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Inexpensive Nifty-Lifters end confusion and congestion in shipping and storerooms by facilitating and speeding up distribution of materials. A single Nifty-Lifter and four to fifteen skids cut needless handling as much as 61%. Flat deck, staked, rack and shelf type skids in all sizes. Rugged construction throughout to resist excessive conditions.

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IT PAYS TO AVOID TIRING STRAIN

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That's Right

3rd Comfort Feature
Steps Up Efficiency

Kewanee Ever-Hold Stools and Chairs have "comfort shape" in seats, "comfort support" in backs, and the third comfort feature "comfort working height," the most important of all. No wonder workers keep up speed and still have pep and a smile at quitting time. Kewanee Ever-Hold Chairs are instantly adjustable to any height without use of tools or gadgets. Every worker can adjust his own chair to the height that's right for him. Write for Special Folder, prices and Discounts on—



Chair B-1721
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HELP
THAT
HELPS



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COMPARATIVELY
HARMLESS DUSTS



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The No. 55 (herewith illustrated) has a comfortable rubber face mask which is easily adjusted to fit all face shapes and sizes. Only a moment is needed to shape the mask by bending a wire forming spring to fit lean, full or medium faces. Filters and all parts are easily and economically replaceable.

WILLSON
DOUBLE
PRODUCTS INCORPORATED
READING, PA., U.S.A.



Write for
COMPLETE
CATALOG

general policy of producers to quote irrespective of the location of the consumer, provided he is within 200 miles, but frequently the producer is even more liberal: consumers located within 25 miles of a refinery may get a discount of 1/8-cent.

Railroads grant refining-in-transit freight rates which effect a considerable saving. Thus blister copper from the Southwest may be shipped to a refinery on the eastern seaboard and the refined product shipped on to a Connecticut fabricator. As an example, the rate from the Southwest to the refinery may be \$17 per ton; the rate from the refinery to the fabricator, \$5 per ton; a total of \$22 per ton. But the total refining-in-transit rate may be only \$18.50 per ton, the chief stipulation being that the refining be done within a year and the metal sent along on its way.

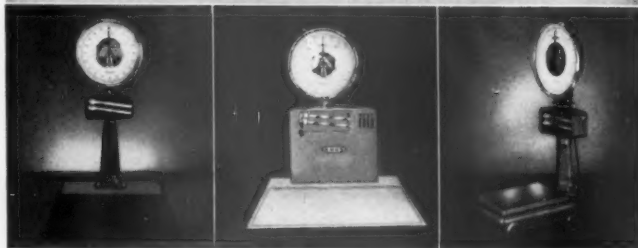
Since in the present era of the copper market, prices are generally identical from all producers, there is not much use of shopping around. Accordingly there is a tendency to buy copper from a regular source. A long-established contact between buyer and seller carries with it unusual service and good advice. The producer in such a relationship will give his best opinion on market conditions, and will not try to encourage a sale if he feels that the market is about to decline. As a case in point, the writer may cite a statement recently made to him by an official of a copper producing company. He said: "Mr. C has bought copper from our firm, from me, for at least thirty years, and I don't believe he has ever bought copper from any other firm. Through these years, he and I have kept each other posted to the best of our ability."

Rush is Promoted

C. A. RUSH has been appointed Vice President in charge of purchases for the Liggett Drug Store Company, New York, succeeding W. J. RASH, resigned. For the past several years, Mr. Rush has been manager of the cigar and liquor departments of the company, at the New York office.

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remember Scully!

SUNDAY...
boiler broke down . . .
customer must have
tubes at once.



One Sunday morning the phone rang at the home of one of our Chicago men. A frantic customer was on the line—a boiler had broken down. Immediate repairs were imperative. Could we help?

We rounded up men...
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delivered tubes the
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We could and did. Men were sent to the warehouse and the necessary NATIONAL Seamless Boiler Tubes were delivered that same morning. This prompt action saved the owner expense and trouble.

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Regular Orders
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But that's just a sample of Scully Service in an emergency. Regular orders always get quick action, too. For it is the rule at each of the eight Scully Warehouses to assume that our customers want prompt service always—no matter how large or small their order may be. And our customers have

learned that they can *always* depend upon Scully for prompt, reliable, friendly service.

When you need boiler tubes—call Scully. And call Scully, too, for whatever you need in steel, steel products, copper and brass. Ask for the Scully Stock List and Reference book. It's free.



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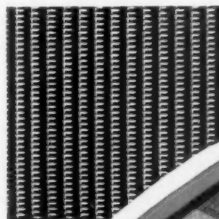
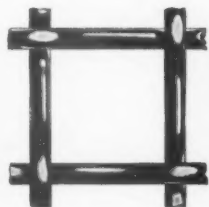
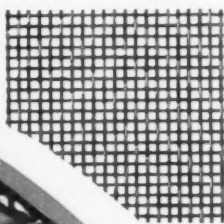
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**Wire Cloths and Screens
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Galvanized Steel,
Stainless Steel,
Phosphor Bronze, Brass,
Copper, Monel, Aluminum,
—any special metal, for any sort of service.**



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Steel wire cloths 8 meshes to the inch or coarser may be galvanized after weaving in long lengths, in widths up to 54 inches. Wider widths may be galvanized after weaving in short lengths. Finer meshes may be woven of wire which has been galvanized before weaving.

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CHECK the features in the diagram below and you'll see the sound valve engineering behind this Jenkins Fig. 624, 125 lb. Regrinding Swing Check Valve.

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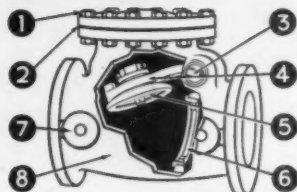
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Guide to Figure Numbers of
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	SCW.	FLG.	SCW.	FLG.	SCW.	FLG.
125 Lbs.	617	618	619	620	623	624
150 Lbs.	928	929	930	931	—	—
250 Lbs.	934	935	936	937	—	—

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